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Original Article

Alvarado Score is a Helpful Tool to Improve Outcomes of Acute Appendicitis at Lampang Regional Hospital

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Abstract

Background: The diagnosis of acute appendicitis is still problematic due to various stages of clinical presentation. Alvarado Score is one of the tools expected to help the diagnosis and our institute has used it as appendicitis protocol since October 2016. We aimed to assess the usefulness of Alvarado Score.

Methods: Cross-section study was carried out in all patients who underwent appendectomy at the Lampang Regional Hospital between October 2013 and December 2016. Data were compared and analyzed between “Alvarado Assessment” group (AA group) and “No Assessment” group (NA group).

Results: Alvarado score was used more frequently in a period after October 2016 compared to a prior period (72.9:17.7 %, $p < 0.01$). A total of 5,087 patients were included, with 45.7% of men and 54.3% of women. In the AA group, appendectomy was performed earlier (operation performed within 24 hours = 98.8% vs. 97.1%; $P < 0.01$), length of stay was shorter (mean \pm SD = 2.8 \pm 1.53 vs. 3.1 \pm 2.34 days, $P < 0.01$), perforation rate was lower (5.8% vs. 12.2%, $P < 0.01$) and the negative appendectomy rate (NAR) was lower (23.8% vs. 30.4%, $P < 0.01$) compared to the NA group. However, there were no differences in surgical site infection and mortality rate.

Conclusion: Advantages of Alvarado assessment included support of correct diagnosis, easier decision making resulting in faster time to operate and better clinical outcomes.

Keywords: Pending, Alvarado Score

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INTRODUCTION

Acute appendicitis is the most common condition in acute abdomen. The incidence rate is approximately 233/100,000 population¹. Lifetime risk is about 7%². Appendectomy is the most surgical abdominal procedure performed^{3,4} due to its high volume of cases. Delayed diagnosis leads to poor clinical outcomes including ruptured, infective process, prolonged hospital stay and increase mortality⁵.

In general, the diagnosis of acute appendicitis is made by clinical presentation including basic laboratory tests but there are still problems. The physicians having different experiences made different diagnosis, investigation and management with varied clinical outcomes. Several scoring systems for diagnosing appendicitis have been reported⁶⁻¹¹. The best known is the Alvarado score. In 1986, Alvarado⁶ constructed a 10-point clinical scoring system, also known by the acronym MANTRELS, for the diagnosis of acute

appendicitis as based on symptoms, signs and diagnostic tests in patients presenting with suspected acute appendicitis.

Previously the use of Alvarado score assessment for diagnosis of acute appendicitis at Lampang Regional Hospital varied based on individual physicians and not mandatory. Since October 2016 we started a project using appendicitis protocol or Alvarado score assessment routinely in the Surgery Unit (Figure 1). This project was used to support the government policy of surgery service plan that aimed to reduce morbidity and mortality of acute appendicitis. One of our processes was Alvarado score assessment. The aim of this study was to determine the advantages of the score assessment compared with no score assessment. We aimed to compare possible complications including perforation, wound infection, and mortality rate and potential benefits in term of time to operation, length of hospital stay and negative pathologic specimens.

Guideline for Acute appendicitis at Lampang Regional Hospital Alvarado Score for Acute Appendicitis		
Signs	Yes	No
Right Lower Quadrant Tenderness	②	①
Elevated Temperature (> 37.3°C)	①	①
Rebound Tenderness	①	①
Symptoms		
Migration of Pain to the Right Lower Quadrant	①	①
Anorexia	①	①
Nausea or Vomiting	①	①
Laboratory Values		
Leukocytosis > 10,000	②	①
Leukocyte Left Shift	①	①
Score < 4 (96% probability diagnosis is not appendicitis) → observe and reevaluate		
4 ≤ Score < 7 → Consider imaging ○ CT ○ US ○ observe ○ Other.....		
Score ≥ 7 (58 – 88% chance of positive appendicitis) → Consider surgery		

Figure 1 Appendicitis Protocol

MATERIALS AND METHODS

This cross sectional study was carried out at the Lampang Regional Hospital between October 2013 and December 2016. The study included patients with final diagnosis of acute appendicitis (K352, K353 and K358 on ICD 10 version 2009). Alvarado score assessment was recorded anytime during visit from admit to discharge. Compared data between Alvarado score assessment group (AA group) and No assessment group (NA group). Data including patient general characteristics, results of treatment and pathologic reports were recorded.

Statistics

Comparative data were analyzed by Fisher's exact test and variable data by 2 sample t-test using Strata software version 11.0.

RESULTS

The protocol was started in October 2016, we found more Alvarado score assessment compared to previous time (72.9:17.7 %, $p < 0.01$). Data of 5,087

patients were analyzed. Patients' age was between 2 to 100 years old (mean \pm SD = 39.9 ± 20.6 years old). There were 2,759 women (54.3%) and 2,328 men (45.7%). There were more female ratio (57.1% vs. 53.5%, $p = 0.03$) and older (mean \pm SD = 41.9 ± 19.07 vs. 39.4 ± 21.02 years old, $p < 0.01$) when compared between AA group and NA group. But there were no difference in term of concurrent comorbidity equal or more than 3 diseases (Table 1).

Faster appendectomy was found in the AA group that presented in term of appendectomy within 24 hours (98.8:97.1%, $p < 0.01$) synchronously but not statistically significant when we concerned the time from admission to operation (mean \pm SD = 6.08 ± 4.66 : 14.4 ± 234.76 hr., $p = 0.13$)

Clinical benefit of the AA group was also found in term of shorter length of stay (mean \pm SD = 2.8 ± 1.53 : 3.1 ± 2.34 days, $p < 0.01$), and less perforated rate (5.8:12.2%, $p < 0.01$) (Table 2). There were no differences between groups in term of infected wound (0.37:0.45%, $p = 0.49$) and mortality rate (0.1:0.2%, $p = 0.69$).

Appendix specimens were sent for pathologic

Table 1 Patients' characteristics

	No Alvarado assessment	Alvarado assessment	p-value	Both groups
N (%)	4,016 (78.9)	1,071 (21.1)	NA	5,087 (100.0)
Age (mean \pm SD) yr.	39.4 ± 21.02	41.9 ± 19.07	< 0.01	39.9 ± 20.6
Female : male (%)	53.5 : 46.5	57.1 : 42.9	0.03	54.2 : 45.7
Co-morbid > 3 dis. (%)	4.03	3.92	0.93	4.01
Before:after project* (%)	82.3 : 27.1	17.7 : 72.9	< 0.01	

*Appendicitis protocol for improved diagnosis and treatment of appendicitis since October 2016

Table 2 Clinical outcomes

	No alvarado assessment	Alvarado assessment	p-value	Both groups
Time to operation (mean \pm SD) hour	14.4 ± 243.76	6.08 ± 4.66	0.13	12.7 ± 216.61
Appendectomy within 24 hr (%)	97.1	98.8	< 0.01	97.5
Perforated (%)	12.2	5.8	< 0.01	10.8
Length of stay (mean \pm SD) days	3.1 ± 2.34	2.8 ± 1.53	< 0.01	3.07 ± 2.20
Infected wound (%)	0.45	0.37	0.49	0.43
Mortality (%)	0.2	0.1	0.69	0.18

Table 3 Negative Appendectomy Rate (NAR)

	No alvarado assessment	Alvarado assessment	p-value	Both groups
Pathologic report : Total (%)	3,556:4,016 (88.5)	790:1,071 (73.8)		4,346:5,087 (85.4)
Negative appendectomy NAR (%)	1,081 (30.4)	188 (23.8)	<0.01	1,269 (29.2)

examination in 4,346 of 5,087 (85.43%) and confirmed acute appendicitis in 70.8%, making negative appendectomy rate (NAR) of 29.2%. Data showed less NAR in the AA group (23.8 versus 30.4%, $p < 0.01$) (Table 3)

DISCUSSION

Because of high volume of acute appendicitis in Thailand, the Thai Ministry of Public Health aims to reduce the morbidity and mortality. Previous studies concluded advanced disease at presentation, duration of symptoms, old age increase perforation rate, infection and mortality¹²⁻¹⁶. Generally early diagnosis and treatment yield better result. Conversely early surgical treatment leads to high negative and unacceptable appendectomy specimen. Therefore early diagnosis not delayed or exaggerated is the key of success.

Only clinical presentation for diagnosis of acute appendicitis may be inadequate, many tools including history, physical examination and basic laboratory were applied to improve accuracy of diagnosis. Among various scores, for example appendicitis inflammatory response, Lintula, Lindberg, Ohmann, RIPASA, and pediatric (Samuel) score^{7-11,17,18}, strong evidences from systematic review suggests that Alvarado score is the most popular and can be applied easily in all ages and make accurate diagnosis¹⁹. A recent clinical policy document from the American College of Emergency Physicians reviews the value of using clinical findings to guide decision making in acute appendicitis²⁰. Additional investigations such as serum C reactive protein, abdominal ultrasonography, CT scan or even MRI may help to make more accurate diagnosis²¹⁻²⁹ but these are time consuming, costly and have no practical use in many parts of Thailand.

The advantages of Alvarado score assessment

conclude from this study is shorter length of hospital stay and less perforated rate. The possible reasons may be from early time to operation same as previous studies³⁰. In our hospital patients with a score less than 4 were on observation, with 5-6 were sent to imaging or on observation and reevaluated score subsequently depending on surgeon's desire. Patients with score equal or greater than 7 were sent to operation. So it is easier to make decision for management in Alvarado assessment group and may explain why it is faster to operate. However, there was no difference in mortality rate or infected wound for both groups in this study due to too low incidence, perhaps long-term study should be continued.

One interesting finding was the negative appendectomy rate (NAR) - defined as the portion of pathologically normal appendices removed surgically in patients suspected of having acute appendicitis³¹ that showed up to 30% in this study higher than other studies that range from 15 to 25%^{8,32}. NAR decreases nowadays over the past conversed to rising of pre-operative CT³³. Many preoperative investigations such as ultrasound or CT hope to decrease the NAR but only CT use had demonstrated a reduction in the NAR³⁴⁻³⁶. In our hospital like many others in Thailand, CT was too expensive and not routinely used. Our results support Alvarado score assessment to decrease NAR regardless of CT use.

High rate of NAR from this study synchronized to early appendectomy rate as referred to over 97% operated within 24 hours in all groups. This may explain better results than many studies such as lower wound infected rate (0.43% in this study against 4.2 - 5.8% in previous studies^{8,37-39} and lower perforated rate (10.8% vs. 16-30%) in others⁴⁰⁻⁴¹. Again, faster operation may be a good explanation of no difference in perforated or mortality rate whether using Alvarado assessment or not.

Limitation of this study was that it cannot control exact time to further investigation or operations when assigned. These factors depended on volume of cases and operative room vacancy. So the diagnosis or treatment may be delayed. Another limited point was still alternative choice in question (score 5-6) that patients were observed or investigated by imaging depending on doctor's preference. So some of this group had faster appendectomy than other group and yield better outcomes.

Finally, despite limited data or doctor bias, Alvarado score assessment is still cheap, safe, advantageous and practical for acute appendicitis diagnosed in our area.

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บทคัดย่อ **การใช้แบบประเมิน Alvarado score ในโรงพยาบาลลำปางต่อผลการรักษาภาวะไส้ติ่งอักเสบ**
สหธรรม สมินทรปัญญา
กลุ่มงานศัลยกรรม โรงพยาบาลลำปาง

ความเป็นมา: ปัจจุบันยังคงมีปัญหาในการวินิจฉัยภาวะไส้ติ่งอักเสบเฉียบพลัน อันเนื่องมาจากระยะของโรคและอาการแสดงที่แตกต่างกัน แบบประเมิน Alvarado score ถูกกำหนดเป็นนโยบายและเริ่มนำมาใช้ในโรงพยาบาลลำปางอย่างจริงจังตั้งแต่เดือนตุลาคม พ.ศ. 2559 โดยหวังว่าจะพัฒนาการการวินิจฉัยและรักษา อย่างไรก็ตามยังไม่มีการศึกษาถึงผลลัพธ์ของการใช้แบบประเมินนี้

วัตถุประสงค์และวิธีการ: เป็นงานวิเคราะห์ตามขวางของข้อมูลผู้ป่วยที่ได้รับการวินิจฉัยเป็นไส้ติ่งอักเสบในโรงพยาบาลลำปางที่ได้รับการผ่าตัดระหว่างเดือนตุลาคม พ.ศ. 2556 ถึงสิ้นเดือนธันวาคม พ.ศ. 2559 โดยเปรียบเทียบระหว่างการใช้และไม่ใช้แบบประเมิน Alvarado score

ผลการศึกษา: มีการประเมิน Alvarado score หลังเริ่มโครงการมากขึ้นอย่างมีนัยสำคัญ เมื่อเปรียบเทียบกับช่วงก่อนหน้า (72.9:17.7%, $p < 0.01$) จำนวนผู้ป่วยทั้งสิ้น 5,087 ราย ประกอบด้วยเพศชาย 45.7% และ เพศหญิง 54.3% ผลการเปรียบเทียบระหว่างกลุ่มพบว่า ในกลุ่มที่ใช้แบบประเมิน ได้รับการผ่าตัดที่เร็วขึ้น โดยได้รับการผ่าตัดภายใน 24 ชั่วโมง (98.8:97.1%, $p < 0.01$) มีระยะเวลานอนโรงพยาบาลสั้นกว่า (2.8 ± 1.53 วัน: 3.1 ± 2.34 วัน, $p < 0.01$) มีอัตราการแตกของไส้ติ่งต่ำกว่า (5.8%:12.2%, $p < 0.01$) และอัตราการผ่าตัดผิด (negative appendectomy rate) น้อยกว่า (23.8:30.4%, $p < 0.01$) อย่างไรก็ตามไม่พบความแตกต่างของการติดเชื้อแผลผ่าตัด และอัตราการตายระหว่างกลุ่ม

สรุป: การใช้แบบประเมิน Alvarado score มีประโยชน์ในการช่วยสนับสนุนการวินิจฉัยที่ถูกต้อง ทำให้ตัดสินใจง่ายขึ้น และส่งผลให้ผู้ป่วยได้รับการผ่าตัดเร็วขึ้นและมีผลการรักษาดีขึ้น

Laparoscopic Hepatectomy: Technique and Outcomes of a 28-Case Series in 5-year Experience at Paolo Hospital, Phaholyothin, Bangkok, Thailand

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Abstract

Background: Laparoscopic hepatectomy is a highly advanced, challenging surgical technique for liver resection surgery which obviously provides a bunch of benefits for the patients such as smaller incisions, easier approach to difficult area of tumor site, less tissue trauma, less intraoperative blood loss, less postoperative pain, quicker return of bowel function, shorter recovery period, and lower morbidity rates. However, to achieve success is not easy. It needs a readiness of several success factors including an expert surgeon as well as a specialized and experienced surgical team, sufficient and effective laparoscopic assisted surgical devices. This is why laparoscopic hepatectomy is still not a common seen operable procedure for liver resection in all surgical centers. This case series is to review our developing experience in laparoscopic hepatectomy along a 5-year journey of Paolo Phaholyothin Hospital.

Methods: Twenty-eight patients undergoing laparoscopic liver surgery between January 2013 and August 2017 were reviewed. The data set includes patient characteristics, indication for surgery and tumor description, operative procedure and duration, conversion to open surgery rates, intraoperative blood loss and blood component replacement, postoperative analgesic requirement, pathological reports, surgical outcomes and length of hospital stay.

Results: Age range from 36 to 94 years, male/female: 13/15, mean BMI: 25.4, 20/28 of lesions were malignant, and 8/28 benign. Operations included major right/left lobe hepatectomy (n = 8), segmentectomy (n = 20), and mean operative time: 277 minutes (range 120 to 585). Neither conversion to open operation nor reoperation was done. Mean intraoperative blood loss: 390 mL (range 20-2000) with only 3 cases received blood transfusion. Mean doses of postoperative opioid requirement: 2 (range 1-5), resumption of oral intake on postoperative day 2, ability to walk without support within 48 hours, median length of hospital stay: 6.6 (range 3-11), and return to work within 2 weeks. No case of prolong bile leakage or postoperative bleeding was recorded. Along our continuing follow-up time range 2-50 months, only 3 of 20 malignant cases had local disease recurrence, only 1 died due to heart disease and extreme aging.

Conclusion: Laparoscopic liver resection surgery has obviously more several superior advantages for the patients than open surgery. Even though to achieve success it needs to overcome many factors, but it is worth for the surgeons to push themselves forward harder and more to be an expert in this procedure.

Keywords: Laparoscopic, hepatectomy, liver resection

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INTRODUCTION

Laparoscopic hepatectomy was first reported by Michel Ganger from Canada in 1992. In Thailand, this procedure has slowly been increasing and can be operated only in some hospitals. Laparoscopic hepatectomy is such an advanced laparoscopic surgery that needs high proficiency and high ability of the performer to control bleeding, to suture, and to resect the lesion especially in difficult areas. Furthermore, the cost is very high due to many high-tech gadgets required such as laparoscopic ultrasound probe, harmonic scalpel, sealing vessel device instrument. In our experience at Paolo Hospital, a 250-bed, tertiary-care, private hospital in Bangkok, Thailand, the first case of laparoscopic hepatectomy was successfully done in 2010 in the patient who was diagnosed with benign cystic lesion at segment 6. Thereafter, our cases were preferably carried out using more laparoscopic hepatectomy than open laparotomy.

Until now, more than 3,000 cases of laparoscopic hepatectomy have already been performed worldwide¹⁻⁶. If successful, it has been shown to be a very useful technique that will provide ultimately high benefits for the patients. Several various approach techniques have been applied for laparoscopic liver resection depending on tumor size and site, extent of resection, and surgeon preference. These include total laparoscopic, hand-assisted, hybrid technique, and robotic liver resection^{1,7,8}. This study was to demonstrate our experience in performing laparoscopic hepatectomy which consisted of both total laparoscopic and hand-assisted techniques.

METHODS

We explored our database completely back to 2013. Therefore, the patients undergoing laparoscopic hepatectomy between January 2013 and August 2017 were retrospectively unveiled in terms of clinical case series. Perioperative important data of every single case was collected. Preoperative data included age, sex, liver function, underlying disease, indication for surgery, tumor site and size. Intra-operative details contained of operative procedure and time, extent of resection, method for transection, intra-operative blood loss, and blood components replacement. Post-operative period included recovery outcomes (which defined as return to step diet, normal ambulation, and

cessation of parenteral analgesic requirement), surgical complications, length of hospital stay, pathological report and resection margin.

RESULTS

A total of 28 cases of laparoscopic hepatectomy were collected. Patient characteristics and other perioperative parameters of each individual patient were demonstrated in Table 1.

The age of patients ranged from 36 to 94 years with a male: female ratio of 13: 15. All patients in this series had a mean BMI of 25.4 Kg/m² and preoperative serum albumin > 3 g/dL. Eight of total underwent right or left lobe hepatectomy. The remaining underwent segmentectomy, mostly done with more than one segment. We started with a pure laparoscopic approach for all cases. Some cases needed to be converted to a hand-assisted technique because it was a large hepatic resection which required extended incision in order to remove the tumor.

No patient was converted to open laparotomy or even reoperation. Duration of operation ranged from 120 to 585 minutes with a mean of 277 minutes. The initial cases took longer operative time than the subsequences. However, major hepatectomy was more performed in the latter. No gas embolism and no morbidity were reported in this series. The pathological reports of all cases were summarized in Table 2.

Intraoperative blood loss varied from 20 mL-2,000 mL, with a mean of 390 mL per each. Of these, there were only 3 cases who received blood transfusion intraoperatively (case number 8, 21, and 23, respectively in Table 1). The first case (No. 8) had preoperative hematocrit (Hct.) at 30%, and underwent laparoscopic right lobe hepatectomy. He received 2 units of packed red blood cells (PRCs) and 2 units of fresh frozen plasma (FFP) transfusion. The second case (No. 20), who had preoperative Hct. at 30% and underwent laparoscopic left lobe hepatectomy, received 1 unit of PRCs transfusion. The third case (No. 23) had preoperative Hct. at 21% and underwent laparoscopic right lobe hepatectomy. She received 2 units of PRCs transfusion. In our series, there were 4 cases (case No. 2, 8, 19 and 26) who had history of coronary heart disease and were taking antiplatelet medications (Clopidogrel, Aspirin). We discontinued it 3 days prior to surgery and restarted within 24 hours

Table 1 Demographic, intraoperative, and postoperative details of 28 patients undergoing laparoscopic hepatectomy

Patient	Age	Sex (M/F)	BMI	Underlying diseases	Pre-operative Diagnosis	Type of operation	Pathological Report	Tumor site (segment)	Tumor Size (cm.)	Operative time (minutes)	Blood loss (mL)	Blood transfusion	Postoperative IV opioids	Postoperative NSAIDs	Length of stay (days)	Follow up period (months)
1	74	M	25.39	HT, DLP, Hepatitis B		Laparoscopic segmentectomy	Cholangio CA	Seg-6	3x2.9x2.2	250	800	No	Pethidine 50 mg x 4	No	7	50
2	63	M	20.43	DM, CAD Postop Axillo-bifemoral bypass 3 years, CAB, Alcoholic liver cirrhosis		Lap Laparoscopic Right lobe Hepatectomy +segment 4b Hepatectomy +LC	HCC	Seg-7 Seg-6 Seg-5	4.2x4.6x6.5 1.8 x 1.9 1 x 0.8	225	500	No	Pethidine 50 mg X 5	No	8	46
3	44	F	16.82	CA ovary		Laparoscopic segmentectomy	Metastasis poorly differentiated carcinoma	Seg 4a	2 x 2.4	85	20	No	-	No	3	45
4	42	F	21.9	CA colon		Laparoscopic Right lobe Hepatectomy 5,6,7,8	Metastasis Adeno-carcinoma	Seg 7 Seg 5/8	1.2 x 1.1 1.9	445	300	No	Pethidine 30 mg x 5	No	8	45
5	79	F	31.22	DM, HT, DLP		Laparoscopic partial right lobe Hepatectomy	Cavernous hemangioma	Seg 6	5x6	150	500	No	Pethidine 50 mg	No	6	43
6	36	M	30.15	Hepatitis B		Laparoscopic Segmentectomy	HCC	Seg 6	4	245	1,000	No	MO 5 mg x 2	No.	8	37
7	42	F	23.55	No		Laparoscopic Segmentectomy	Benign non dysplastic nodule	Seg 2	1	210	150	No	MO 10 mg x 2	No	7	35
8	73	M	23.8	HT, DLP, DM, PCI 2556		Laparoscopic Right lobe Hepatectomy	HCC	Seg 8/7	4.7x4.4 x4.7	585	2,000	FFP 2u LPRC 2u	MO 10 mg X 5	No	10	31
9	67	M	29.64	HT, DLP, Left lobe Hepatectomy 5 years ago		Laparoscopic segmentectomy	HCC	Seg 5	3	365	300	No	Pethidine 50 mg x 1 dose	No	8	21

Table 1 (cont.) demographic, intraoperative, and postoperative details of 28 patients undergoing laparoscopic hepatectomy

Patient	Age	Sex (M/F)	BMI	Underlying diseases	Pre-operative Diagnosis	Type of operation	Pathological Report	Tumor site (segment)	Tumor Size (cm.)	Operative time (minutes)	Blood loss (mL)	Blood transfusion	Postoperative IV opioids	Postoperative NSAIDs	Length of stay (days)	Follow up period (months)
10	94	F	24.67	DM, HT		Laparoscopic Left lobe Hepatectomy + LC	Metastatic Adeno-carcinoma	Seg 2,3	4.4	245	200	No	MO 2 mg Pethidine 50 mg	No	5	20
11	55	F	20.58	CA Ovary		Laparoscopic Segmentectomy Hepatectomy	Metastatic Spindle cell tumor	Seg 5 (2 mass)	1.3x1.4x1.3 1.9x2.1x2.4	300	200	No	Pethidine 50 mgx11	No	7	18
12	51	M	31.23	No		Laparoscopic Segment V, VII Hepatectomy with Cholecystectomy	Local nodular hypoplasia	Seg 5 Seg 7	1.6 1.2	250	100	No	Pethidine 50 mg IM	No	3	17
13	36	F	27.2	No		Laparoscopic segmentectomy + Cholecystectomy	FNH (focal nodular hyperplasia)	Seg 6	2.4x2.2	340	150	No	-	Dynastat 40 mg	10	17
14	51	M	23.7	No		Laparoscopic lateralsegmentectomy	Cavernous hemangioma	Seg 2 (2) Seg 3	1.7x1.0 2.1x2.5 0.5	120	100	No	Pethidine 50 mg	Dynastat 40 mg	7	17
15	43	M	25.1	No		Laparoscopic Right lobe Hepatectomy	Hepato-cellular carcinoma	Seg 5,6,7,8	4.6 x 6.5	285	450	No	Pethidine 50 mg x 3	Dynastat 40 mg	6	17
16	68	F	31.6	HT, DLP		Laparoscopic right partial lobe Hepatectomy + Cholecystectomy	Low grade dysplastic nodule	Seg 8 Seg 6	1.2 1.0	240	100	No	Pethidine 50 mg x 3 doses	No	5	15
17	66	M	24.97	DM, HT, DLP		Laparoscopic segmentectomy	HCC	Seg 7	2	350	200	No	Pethidine 50 mg	No	8	13
18	61	F	28.90	DM, Chronic Hepatitis B		Laparoscopic Segmentectomy 3,7+8 + LC	HCC	Seg 3 Seg 7	0.8 4.5	300	500	No	MO 2 mg x 2 Pethidine	No	9	13
19	58	M	37.73	DM, HT, CAD, DLP, liver cirrhosis		Laparoscopic segmentectomy	HCC	Seg 7/8	2.1	335	100	No	MO 10 mg x 2	No	10	13

Table 1 (cont.) emographic, intraoperative, and postoperative details of 28 patients undergoing laparoscopic hepatectomy

Patient	Age	Sex (M/F)	BMI	Underlying diseases	Pre-operative Diagnosis	Type of operation	Pathological Report	Tumor site (segment)	Tumor Size (cm.)	Operative time (minutes)	Blood loss (mL)	Blood transfusion	Postoperative IV opioids	Postoperative NSAIDs	Length of stay (days)	Follow up period (months)
20	63	M	23.9	No		Laparoscopic left lobe Hepatectomy	Metastatic Adeno-carcinoma	Seg 2 Seg 4	2 4	230	700	LPRC 1	MO 10 mg	No	4	11
21	68	F	24.19	No		Laparoscopic segmentectomy + lap resection at cul de sac	Metastatic Adeno-carcinoma	Seg 5	3.1 x 3.4 x3.4	255	200	No	No	No	6	11
22	54	F	22.71	No		Laparoscopic left lobe Hepatectomy	Metastatic Adeno-carcinoma	Seg 3	2.8	165	200	No	MO 4 mg	No	5	10
23	61	F	19.11	HT, DM, DLP		Laparoscopic Right lobe Hepatectomy	Poorly differentiated Carcinoma	Seg 5/6	6.2x9.2 x11	493	900	LPRC 2u	MO 10 mg	Dynastat 40 mg X1 dose	11	10
24	63	M	21.99	Chronic Hepatitis C		Laparoscopic Right lobe Hepatectomy	HCC, Poorly differentiated	Seg 7/6 Seg 8 Seg 5	4.9x3.4 x4.2 1.5x1.2	545	400	No	MO 10 mg x 2	Dynastat 40 mg 1 dose	9	10
25	69	F	24.74	HT		Laparoscopic partial right lobe Hepatectomy + Cholecystectomy	Cavernous hemangioma	Seg 6	4.3x4.2 x2.8	120	50	No	MO 5 mg X 2	No	4	9
26	75	M	23.8	HT, DLP, DM, PCI (2556)		Laparoscopic segmentectomy + Cholecystectomy	HCC	Seg 2,3	2	265	300	No	MO 10 mg X 3	No	5	4
27	69	M	30.2	CA colon, Post Lap Cholecystectomy		Laparoscopic segmentectomy	Metastatic Adenocarcinoma	Seg 6 (3)	0.9 0.62	205	300	No	Pethidine 50 mg x 3	No	4	2
28	47	F	24	No		Laparoscopic left lobe Hepatectomy	Cavernous hemangioma	Seg 2 Seg 3 Seg 4	5.7 2 2	180	200	No	Pethidine 50 mg x 3	No	3	2

Abbreviations: M: Male; F: Female; BMI: Body mass index; Seg: Segment; HCC: Hepatocellular carcinoma; DM: Diabetes mellitus; HT: Hypertension; DLP: Dyslipidemia; C-AD: Coronary artery disease; CAB: Coronary artery bypass; PCI: Percutaneous coronary intervention; LPRC: leukocyte-poor red cells; FFP: fresh frozen plasma

Table 2 Pathological Reports

Pathological Report	N (cases)
HCC	10
Metastasis Adenocarcinoma	7
Cavernous Hemangioma	4
Local Nodular hyperplasia	2
Dysplastic nodule	2
Cholangiocarcinoma	2
Metastasis spindle cell carcinoma	1

postoperatively. The mean blood loss of these 4 cases was 725 mL which was more than overall average (390 mL), and only one case (No. 8) received blood transfusion. Moreover, 2 of these 4 cases underwent major right lobe hepatectomy. If excluded of these two, the mean blood loss would be only 200 mL.

A tube drain was placed in every patient and taken out on the 4th postoperative day or until there was no show of any bile or blood. The patients required opioid-based analgesic requirement varied from 1 to 5 doses (mean = 2), postoperatively. Oral intake was resumed on the 2nd postoperative day. All patients were able to walk by themselves within 48 hours. Length of postoperative hospital stay ranged from 3 to 11 days (median = 6.6).

We had followed up our patients with a mean

period of time of 20.7 months (range 2-50). They were able to be back to work within two weeks. All patients achieved relief from their symptoms completely. Among the patients who were diagnosed with cancer, there were three cases of tumor recurrence. Of these, one (No. 10) died eight months later with heart disease and metastasis, while the other two (No. 2 & 8) underwent the second laparoscopic hepatectomy two years later and were still followed up.

DISCUSSION

Laparoscopic hepatectomy is an advancement of the continuing evolution of minimally invasive surgery (MIS). The utmost integration of surgical skills is essentially required for laparoscopic hepatectomy in parallel with the adaptation of laparoscopic technique to this procedure including hi-hilar dissection, biliary or vascular repair, mobilization of the liver, and transection of the parenchyma^{9,10,11,12,13}.

Laparoscopic hepatectomy shows a great variety of advantages over open hepatectomy. Laparoscopic hepatectomy causes immensely less tissue damage and thus helps significantly reduce postoperative pain, shorter hospital stay, and earlier return to daily activities^{14,15,16,17}. In addition, there were two published case-control studies^{11,18} and one cohort study¹⁹ recently showed that laparoscopic hepatectomy provided lower

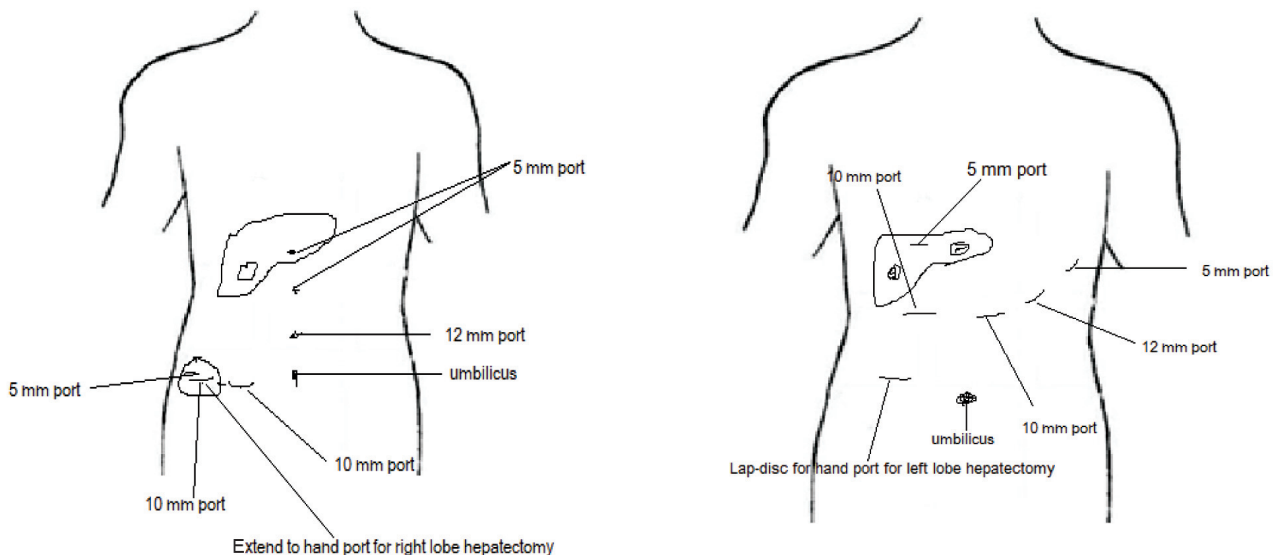


Figure 1 Hand Port and Trocar position (25)

blood loss, reduced morbidity, and fewer operative complications. With regard to an overall malignant disease, there was no significant difference either in tumor recurrence or in long term survival^{18,20,21}. Furthermore, the cosmetic advantages of laparoscopic hepatectomy are obviously excellent. Earlier resumption of oral intake is also a great advantage. For these reasons, the laparoscopic approach should be brought to account for both benign and malignant liver disease^{15,19,11,18,22,23,24}.

Our case series showed that laparoscopic approach was able to be applied for liver resections of malignant and benign conditions as it provides ultimate advantages to our patients. No major or minor complications were detected. Only 2 patients received 2 units of PRC and another patient used 1 unit of PRC blood transfusion. All these 3 cases had initially low hematocrit level before surgery. A mean postoperative hospital stay was 6.6 days and within 2 weeks they all were able to return to their work. Only 2 patients had a tumor recurrence which later achieved success to re-resection by laparoscopic technique. One patient in this series (No. 9) had history of previous open left lobe hepatectomy and still could undergo laparoscopic technique in the second time of operation.

In our complicated cases, patients had underlying disease such as coronary artery disease with status post PCI or major vascular bypass and continued antiplatelet. Stopping the medication only 3 days prior to surgery, and restarting immediately within 24 hours after hepatectomy was interestingly observed that not much bleeding occurred and no evidence of any complications from vascular thrombosis detected.

In our initial experience, we began with laparoscopic peripheral liver resection. After passing the learning curve, we performed major right and left hepatic resection for those who had a large tumor using hand-assisted port to bring out a wide specimen after performing vascular and bile duct ligation.

In all cases, we used an intra-operative laparoscopic ultrasound probe for locating the tumor and vascular supply and for planning a resection margin. Although some cases had inevitably inferior vena cava or hepatic vein injury, it was successfully controlled by increasing abdominal pressure, providing pressure by hand to compress, or using a gauze pack, and applying a Ligaclip. During parenchymal resection, we used the

bipolar cauterization to stop small vessel bleeding, while carefully identified the large vessels and ligated with a Ligaclip, or sometimes with a horizontal mattress suture.

After completing a resection, we carefully checked the raw surface. If there was any bile or capillary leakage, we stopped it by horizontal mattress suture or individual figure of eight suture using an absorbable material. Thus, this was the reason why all our cases had no prolonged bile leakage or postoperative bleeding.

Advantages of the hand port include:

- Tactile feedback
- Facilitation of liver mobilization
- Ability to manually compress the liver
- Elimination of the need to make a separate extraction site incision
- Easiness to stop bleeding or control major vascular impingement
- Help to suture the liver parenchyma in some difficult areas

Conversely, disadvantages of the hand port include:

- Lack of domain
- Interference with the laparoscopic trocars and instruments
- Risk of hand port Incisional hernia
- Increase of postoperative pain
- Need of a learning curve to use a hand port precisely

As per our records, we demonstrated a range of 2 to 50 months survival period of patients undergoing laparoscopic hepatectomy which was equivalent to the open technique. For malignant cases, the pathological report also demonstrated an adequate free margin. Additionally, there was no later report of port-site metastases or intra-abdominal dissemination of tumor recurrence throughout our follow-up time.

CONCLUSION

Our result has emphasized that laparoscopic liver resection is indeed worth and safe for both benign and malignant diseases. It offers the uncountable benefits for the patients. However, an important consideration is undeniable that laparoscopic liver resection must be performed by a proficiently trained surgeon.

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บทคัดย่อ การผ่าตัดก้อนเนื้องอกในตับด้วยวิธีการส่องกล้อง จากประสบการณ์ 5 ปีย้อนหลังของโรงพยาบาลเปาโล พหลโยธิน

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วัตถุประสงค์: เพื่อทำการรวบรวมและติดตามประเมินผลของการผ่าตัดก้อนเนื้องอกในตับด้วยวิธีการส่องกล้องในระยะเวลา 5 ปีย้อนหลัง

วิธีการศึกษา: ทำการรวบรวมข้อมูลผู้ป่วยที่มารับผ่าตัดก้อนเนื้องอกในตับด้วยวิธีการส่องกล้องย้อนหลัง ตั้งแต่เดือนมกราคม 2556 ถึงเดือนสิงหาคม 2560 โดยรวบรวมข้อมูล อายุ, เพศ, โรคประจำตัวของผู้ป่วย, ดัชนีมวลกาย, การวินิจฉัยโรค, ขนาดของเนื้องอก, หัตถการที่ทำการผ่าตัด, ตำแหน่งที่ผ่าตัด, ระยะเวลาในการผ่าตัด, ผลพยาธิวิทยา, ปริมาณเลือดที่เสีย, ปริมาณเลือดที่ให้, ภาวะแทรกซ้อนของการผ่าตัด, ระยะเวลาที่นอนโรงพยาบาล, ปริมาณและความถี่ของยาแก้ปวดที่ให้, ระยะเวลาในการติดตามโรค

ผลการศึกษา: มีผู้ป่วยทั้งหมด 28 ราย อายุ 36 ถึง 94 ปี เพศชาย 13 ราย เพศหญิง 15 ราย ดัชนีมวลกายเฉลี่ย 25.4 Kg/m² เป็นการผ่าตัดตับกลีบขวา หรือกลีบซ้ายทั้งกลีบทั้งหมด 8 ราย ที่เหลืออีก 20 ราย เป็นการผ่าตัดแบบตัดออกเพียงบางส่วน ระยะเวลาในการผ่าตัดเฉลี่ย 277 นาที ไม่มีรายใดที่ต้องเปลี่ยนเป็นการผ่าตัดแบบเปิดหน้าท้อง เสียเลือดเฉลี่ย 390 ซีซี มี 3 รายที่ต้องให้เลือด ผลพยาธิวิทยาเป็นมะเร็ง 20 ราย เป็นมะเร็ง 8 ราย ใช้ยาแก้ปวดชนิดฉีดเข้าหลอดเลือดเฉลี่ย 2 ครั้ง/ราย ระยะเวลาอยู่โรงพยาบาลเฉลี่ย 6.6 วัน ไม่มีรายใดเกิดภาวะแทรกซ้อนจากการผ่าตัด หรือเสียชีวิตจากการผ่าตัด ระยะติดตามผู้ป่วยหลังผ่าตัดโดยเฉลี่ย 20.7 เดือน

สรุป: การผ่าตัดก้อนเนื้องอกในตับด้วยวิธีการส่องกล้องในเวลา 5 ปีที่ผ่านมาถือเป็นการผ่าตัดที่สามารถใช้รักษาทั้งก้อนเนื้องอกชนิดที่เป็นมะเร็งและไม่ใช่มะเร็งได้ ผลการผ่าตัดสามารถทำสำเร็จทุกรายได้ด้วยการส่องกล้องและมีความปลอดภัย ไม่มีผู้ป่วยที่มีภาวะแทรกซ้อนหรือเสียชีวิตจากการผ่าตัดเลย

Effectiveness of Training Programme on Nurses' Wound Care Competencies after One Year of Implementation

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Abstract

This study aims to review the impacts of the nursing training programme on the knowledge, skills and attitude among nurses working in seven clinical departments at Viet Duc University Hospital one year after the interventional programme has been conducted. It was carried out in 2014 and 2015 with a sample size of 145 nurses. The data collection tool included a wound care observation checklist to measure two indicators - the mean score and effects of training on wound care competencies. Data was analysed with SPSS 18.0. The study results showed that the post-training rate of nurses with adequate practice competencies increased from the pre-training survey ($p < 0.001$). The effectiveness indicators relating to the competencies of identification, planning, plan implementation and evaluation were 31.9%; 43.3%; 71.3% and 28.3% ($p < 0.001$). Wound care training programme based on nursing competencies standards has proved to be effective.

Keywords: Nurses, competencies, wound care, training

INTRODUCTION

Wound care is the basic technique in patient care carried out by nurses, having direct effects on the quality of treatment^{1,2}. In England, wound care accounted for up to 3% of its healthcare budget (2.3-3.1 billion pounds/year)³. In reality, the effectiveness of wound care depends on nurses' wound care competencies and techniques. Geraldine McCarthy

(2012) conducted a quantitative study with a sample of 150 nurses who tended chronic wounds at hospital to explore the knowledge and competencies of wound evaluation and management. The study results showed that nurses' knowledge about wound evaluation indicators was relatively good. Besides, nurses who took care of wounds per week more often had better competencies^{4,5}.

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Viet Duc University Hospital is the tertiary level of surgical hospital and referral an education institution in Vietnam. Nearly 200 surgeries are performed on a daily basis and around 1,000 inpatients with wounds are tended. However, nurses working here still had limited knowledge and practice of wound care, which may be because the "Vietnam Nursing Competency Standards" ratified by Vietnam's Ministry of Health in 2012 had not been applied by the Hospital⁶. So we conducted the study aiming to assess the impacts of the training programme on improving wound care competencies among nurses working in Viet Duc University Hospital one year after it was initiated.

MATERIALS AND METHODS

1. Subjects

The study was conducted between 2014 and 2015, and 145 nurses who directly took care of patients at seven clinical departments in Viet Duc University Hospital were enrolled.

2. Methods

The following formula was used to compare the effectiveness of wound care after one year of intervention:

$$\text{Effectiveness indicator} = \frac{(\text{Pre-training indicator} - \text{Post-training indicator})}{\text{Pre-training indicator}} \times 100$$

Data were collected using a wound care practice checklist to determine two indicators: nurses' mean scores and effectiveness of wound care competencies. The wound care observation checklist included four sections, namely identification; planning; implementation; and evaluation, with 16 indicators. The maximum score for practice competencies was 381 points; 70% of which (or 266.7 points) is considered as adequate.

To assess nurses' competencies, we used a 5-point Likert scale in which 1 point represents "highly disagree", 2 "disagree", 3 "neither agree nor disagree", 4 "agree", and 5 "highly agree." The practice competency score is the combination of knowledge, skill and attitude scores (practice section).

Data were entered into Epidata 3.1 and analyzed

with SPSS 18.0. *T*-tests were used to make comparisons about knowledge, skills and attitude before and one year after the nursing training programme was launched. Additionally Chi-square tests and *p* values were used to describe the differences in the proportions of variables before and after training.

3. Ethical issues

This study was approved by the Ethics Committee at Hanoi School of Public Health. The participants who volunteered in the study were reassured that they were entitled to withdraw from the study at any time. All personal information from the participants was kept confidential.

RESULTS

1. General information of subjects

Of the 145 nurses participating in the knowledge assessment before the intervention (training programme), 137 participated in the assessment conducted one year after the intervention. Their average age was 31.24 ± 6.65 . Females accounted for 74.5%, and 100% of them had at least secondary-level education. Their working duration at Viet Duc University Hospital averaged 6.3 years.

2. The effectiveness of the training programme one year after it was launched

2.1 Different types of competencies before and one year after training

Table 1 showed that the total mean score for wound identification after training exceeded that before training (76.17 ± 3.92 vs. 69.11 ± 8.43). All of the mean scores for knowledge, skills and attitude relating to the identification competencies rose from the pre-training assessment, with the biggest increase found in the nurses' knowledge of principles of comprehensive patient care and wound care (7.03 points higher than before intervention).

According to Table 2, the total planning score increased from the pre-training assessment (a 14.35-point rise), from 52.85 ± 8.02 to 67.20 ± 3.49 . The most significant increase was found in the nurses' knowledge of principles, rules and procedures of bacterial infection control (7.03 points higher than before the intervention).

Table 1 Mean wound identification scores before and one year after training

Identification	Total score	Mean score ($\bar{x} \pm SD$)		Difference between mean scores	CI 95%	p*
		Pre-training	Post-training			
Knowledge						
Principles of comprehensive patient care and wound care	44	34.12 ± 6.40	41.15 ± 2.29	7.0	35.91 ± 8.15	<0.001
Principles, rules and procedures of bacterial infection control	10	7.00 ± 1.51	9.40 ± 1.03	2.39	2.08 ± 2.71	<0.001
Skills						
Identifying patients comprehensively and accurately	10	4.71 ± 2.57	8.12 ± 1.19	3.41	2.91 ± 3.91	<0.001
Identifying wounds comprehensively and accurately	10	7.00 ± 1.89	8.51 ± 1.08	1.51	1.14 ± 1.87	<0.001
Identifying/assessing devices, dressings correctly and properly	10	8.00 ± 1.29	8.96 ± 1.02	0.96	0.70 ± 1.22	<0.001
Attitude						
Identifying patients, devices/tools, dressings correctly	10	8.26 ± 1.43	8.97 ± 0.87	0.72	0.44 ± 1.00	<0.001
Total score	94	69.11 ± 8.43	76.17 ± 3.92	7.06	5.51 ± 8.61	<0.001

*Paired T-tests were applied for 133 nurses participating in both before and after the intervention

Table 2 Mean planning scores before and one year after the training programme

Identification	Total score	Mean score ($\bar{x} \pm SD$)		Difference between mean scores	CI 95%	p*
		Pre-training	Post-training			
Knowledge						
Principles of comprehensive patient care and wound care	44	7.00 ± 1.51	9.42 ± 1.03	2.39	2.08 - 2.71	<0.001
Principles, rules and procedures of bacterial infection control	10	34.12 ± 6.40	41.15 ± 2.29	7.03	5.91 - 8.15	<0.001
Skills						
Making wound care plans based on the nursing procedure	10	7.19 ± 1.84	8.74 ± 0.85	1.55	1.24 - 1.86	<0.001
Attitude						
Making sure that patients understand proper and safe wound care	10	7.65 ± 1.73	8.91 ± 0.80	1.26	0.94 - 1.57	<0.001
Total score	74	52.85 ± 8.02	67.20 ± 3.49	14.35	12.91 - 15.79	<0.001

*Paired T-tests were applied for 133 nurses participating in both before and after the intervention.

Table 3 showed that the total mean plan implementation score increased from the pre-training assessment, from 113.33 ± 15.58 to 145.48 ± 10.46 , a 32.15-point rise. The knowledge scores experienced the highest increase over one year (4.95 points).

Table 4 showed that the total evaluation score increased by 13.72 points, from 30.77 ± 7.68 in the pre-training assessment to 44.49 ± 7.09 in the post-training

assessment. The highest increase in scores can be seen in the nurses' knowledge of medical record documentation one year after the intervention (6.75 points).

2.2 Effectiveness for nurses' practice competencies before and one year after training

According to Table 5, the rate of nurses with adequate competencies increased between before and after the training. Particularly, the identification

Table 3 Mean wound care planning scores before and one year after training

Identification	Total score	Mean score ($\bar{x} \pm SD$)		Difference between mean scores	CI 95%	p*
		Pre-training	Post-training			
Knowledge						
Principles and forms of communication at hospital	17	11.78 ± 3.67	15.65 ± 3.36	3.85	3.05 ± 4.65	<0.001
Methods of effective information exchange, professional principles, healthcare laws, health insurance	10	8.30 ± 1.80	9.49 ± 1.60	1.19	0.82 ± 1.57	<0.001
Principles and procedures of clean wound care	2	1.66 ± 0.58	1.99 ± 0.08	0.33	0.23 ± 0.43	<0.001
Principles and procedures of infected wound care	20	13.90 ± 3.61	18.86 ± 2.22	4.95	4.26 ± 5.64	<0.001
Principles and procedures of taking out stitches	14	8.65 ± 2.34	12.26 ± 1.32	3.61	3.16 ± 4.07	<0.001
Principles and procedures of tending wounds with drainage	8	5.37 ± 1.44	7.31 ± 1.06	1.93	1.64 ± 2.22	<0.001
Principles and procedures of caring pressure ulcers	10	7.08 ± 1.82	9.46 ± 1.22	2.37	2.02 ± 2.72	<0.001
Skills						
[Nurses] having the ability to introduce themselves and explain the wound care plan to patients and their family members	10	5.98 ± 2.33	8.35 ± 1.66	2.37	1.89 ± 2.84	<0.001
Performing wound care techniques/ dressing change for different wounds correctly	10	7.32 ± 1.73	9.00 ± 0.89	1.68	1.37 ± 2.00	<0.001
Applying sterilization skills throughout the entire wound care procedure	10	6.92 ± 2.57	9.00 ± 0.93	2.08	1.61 ± 2.54	<0.001
Communicating well with patients, their family members and colleagues in the same wound care team	10	5.49 ± 2.09	8.67 ± 1.04	3.18	2.78 ± 3.57	<0.001
Performing the entire procedure properly	10	8.19 ± 1.29	8.87 ± 0.82	0.68	0.43 ± 0.93	<0.001
Attitude						
Making sure to complete the procedure of safe, high-quality and satisfactory patient care	10	7.95 ± 1.72	8.84 ± 0.75	0.99	0.69 ± 1.29	<0.001
Making sure the work environment be private and patients be respected	10	7.57 ± 1.88	8.91 ± 0.91	1.34	0.99 ± 1.69	<0.001
Making sure wound care devices, consumables and wastes after care be treated properly and safely	10	7.14 ± 2.06	8.69 ± 0.89	1.55	1.18 ± 1.93	<0.001
Total score	161	113.33 ± 15.58	145.48 ± 10.46	32.15	29.07 ± 35.23	<0.001

*Paired T-tests were applied for 133 nurses participating in both before and after the intervention

competency rose from 75.2% to 99.2%; planning competency from 69.2% to 99.2%; implementation competency from 57.9% to 99.2%; evaluation competency from 27.1% to 91.7%; and practice competency from 56.4% to 100%.

The effectiveness indicators for each corresponding type of competencies were 31.9%; 43.3%; 71.3%; 238.3% and 77.3%. All of the changes in those five types of competencies before and after training were statistically significant ($p < 0.001$).

DISCUSSIONS

According to a study conducted by Le Dai Thanh (2008), nurses failed to perform all the dressing change assessment criteria properly for 200 practices⁷, while the figure in Do Thi Huong Thu's study (2005) with the same sample size was 21%⁸. In a study by Ngo Thi Huyen (2012) indicated 61.1% of 162 nurses performed at least one step of the dressing change procedure incorrectly⁹. So the training programme could help them to improve their competencies on nursing practices as well.

Table 4 Mean wound care evaluation scores before and one year after training

Evaluation	Total score	Mean score ($\bar{x} \pm SD$)		Difference between mean scores	CI 95%	p^*
		Pre-training	Post-training			
Knowledge						
Principles and regulations of medical record documentation	32	22.93 \pm 6.23	29.71 \pm 6.19	6.75	5.32 \pm 8.18	<0.001
Skills						
Documenting medical records clearly and properly	10	6.21 \pm 2.83	8.29 \pm 1.17	2.08	1.59 \pm 2.55	<0.001
Attitude						
Making sure to complete the procedure of safe, Making sure patients be take care of safely and know how to take care of and monitor their own wounds after nursing care	10	7.95 \pm 1.72	8.84 \pm 0.75	0.99	0.69 \pm 1.29	<0.001
	10	1.60 \pm 2.56	6.49 \pm 3.21	4.89	4.15 \pm 5.63	<0.001
Total score	52	30.77 \pm 7.68	44.49 \pm 7.09	13.72	12.11 \pm 15.33	<0.001

*Paired T-tests were applied for 133 nurses participating in both before and after the intervention.

Table 5 Effectiveness for each type of competency

Evaluation	Indicators	Before training		After training		p^*	EI (%)
		n	%	n	%		
Identification	Adequate	100	75.2	132	99.2	<0.001	31.9
	Inadequate	33	24.8	1	0.8		
Planning	Adequate	92	69.2	132	99.2	<0.001	43.3
	Inadequate	41	30.8	1	0.8		
Implementation	Adequate	77	57.9	132	99.2	<0.001	71.3
	Inadequate	56	41.1	1	0.8		
Evaluation	Adequate	36	27.1	122	91.7	<0.001	238.3
	Inadequate	97	72.9	11	8.3		
Practice	Adequate	75	56.4	133	100	<0.001	77.3
	Inadequate	58	43.6	0	0		

Professional training for nurses plays an important role in improving their knowledge and practice of wound care. Mohammad YN Saleh et al. (2012) conducted an intervention with pre- and post-assessment on the impacts of training programmes on nurses' knowledge, attitude and practice of pressure ulcers. This study showed that experienced nurses were, the more positive their attitude was and the better their intention of preventing pressure ulcers. Nurses with tertiary or part-time education had better

intention of pressure ulcer prevention and control¹⁰. According to Sally Sutherland-Fraser (2012), 70 operating nurses had good knowledge of pressure ulcer stages after training ($p < 0.05$)¹¹. Phan Thi Dung indicated that nurses participating in a training programme were more likely to identify the wound conditions, patients' demand for care, wound care planning and the dressing procedure better than non-participants^{12,13}.

Mean scores of wound care competencies one year after the training

Nurses scored 76.17 ± 3.92 for wound identification one year after the training, higher than before the training (69.11 ± 8.43) (Table 1). In terms of the ability to make wound care plans, they scored 67.20 ± 3.49 , also higher than before the training (52.85 ± 8.02) (Table 2). The mean score for plan implementation after the training was 145.48 ± 10.46 , much higher than that before the training (113.33 ± 15.58) (Table 3). The figure for evaluation was 44.49 ± 7.09 , compared to 30.77 ± 7.68 before the training (Table 4). The study results showed changes in all post-training competencies. The overall mean score increased by 71.74 points ($p < 0.001$), in which the mean score for identification increased by 7.06 points, planning by 14.35 points, plan implementation by 32.15 points, and decision making by 13.72 points ($p < 0.001$). These results proved the positive effects of the training on nursing competencies.

Effectiveness of wound care competencies one year after the training

Practice competencies increased significantly after the intervention. The proportion of nurses with adequate competencies saw a rise after the training ($p < 0.001$). Nurses with adequate competencies after the training made up 99.2%, far higher than that before the training (75.2%), with the effectiveness indicator of 31.9% (Table 5). Similarly, planning, plan implementation, evaluation and practice competencies showed improvement one year after the training. The effectiveness indicators for those competencies ranged from 43.3% to 238.3% (Table 5). This proved the competencies-based wound care training programme to be effective, and the training programme contributed to improving the nurses' wound care knowledge and skills.

Study limitations

Despite the effectiveness of the intervention, the study had its own limitations. On the one hand, the study only focused on assessing the nurses' competencies based on the observation of their performing wound care, but not on patients' opinions about each element of the nursing competencies relating to wound care. On the other hand, due to the lack of resources and time, the impacts of the

intervention on improving the quality of wound care were not assessed on the basis of indicators such as healing duration for each type of wound, the infection rate and average cost of each wound.

CONCLUSIONS AND RECOMMENDATIONS

All competencies saw positive changes after the training. The mean scores and effectiveness indicators relating to identification, planning, implementation and evaluation all increased ($p < 0.001$). This indicated the effectiveness of the training programme (or intervention) in improving the wound care competencies among nurses at Viet Duc University Hospital. However, due to the study limitations, it is necessary that further research is conducted with the aim to assess the training competencies, impacts of the competencies-based wound care training programme, and factors affecting nurses' competencies. Based on the study results, proper interventive measures should be applied in order to better nurses' competencies as well as the quality of healthcare services.

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Congenital Midline Cervical Cleft: A Case Report

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Abstract

Congenital midline cervical cleft (CMCC) is a rare anomaly of the ventral midline of neck. This anomaly is always present at birth with a midline vertical atrophic skin defect, superior skin-tag like a nipple and an inferior sinus tract. It can be diagnosed and surgically treated in an infancy period. The author reported one case of female neonate with CMCC and operated on one month of age, in order to share experience of this rare anomaly.

Keywords: Congenital anomaly, midline cervical cleft, branchial arch defect

INTRODUCTION

Congenital midline cervical cleft (CMCC) is a rare anomaly of the ventral midline of neck and can be diagnosed at birth¹⁻⁴. From the international literature review by Puscas⁵, at least 195 cases reported in 2015. The embryological origin is not clear. Clinical presentations of CMCC can be identified since birth. The presenting signs appear a cleft defect at the anterior surface of the neck with subcutaneous fibrous cord and a nipple like projection at the upper part and a sinus or fistulous tract at the lower of the defect¹⁻⁴. It may develop secondary complications, such as impairment of neck extension, deformity of the jaw, torticollis and wound infection due to misdiagnosis and incorrect treatment^{6,7}. In the present study, the author reported one case of CMCC which was diagnosed and surgically treated in the neonatal period.

CASE REPORT

A 2-week-old female neonate was transferred from a rural hospital to Buddhachinnaraj Hospital because of a midline cervical lesion. She was conceived from a 31-year-old mother with 38-gestational age and delivered by cesarean section. Her birth weight was 2,505 grams and the APGAR scores were 9 and 10 at the 1 and 5 minutes, respectively.

On physical examination, her temperature and vital signs were normal. A midline cervical lesion revealed a linear cleft extending from the level of the hyoid bone to the suprasternal notch. Average size of the cleft was 2 cm in length and 0.5 cm in width. There was a nipple-like skin swelling at the cephalic end and a sinus opening with mucoid discharge at the caudal end (Figure 1). No associated anomaly was noted.

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Figure 1 A one-month female neonate with a midline cervical cleft consisted of a nipple like skin tag at the superior end and a sinus tract at the inferior end



Figure 2 The excised specimen with a probe inserted in the inferior sinus tract

She underwent surgical treatment under general anesthesia at the age of one month old. An elliptical incision was performed around the edges of lesion through the healthy skin margin. Complete excision of all the pathologic tissue was done with primary skin closure by subcuticular suturing (No. 6-0 absorbable sutured material).

The specimen consisted of an elliptical shaped skin, measuring $2.0 \times 0.6 \times 0.5$ cm. It showed an ulcerative lesion with papillary projection of yellow tissue, measuring 1.2 cm in length and 0.6 cm in width (Figure 2). Histological examination revealed presence of lumina structure like, with squamous and respiratory epithelium lining, striated muscle in dermis and focal parakeratosis.

The final clinical diagnosis of this patient was CMCC. Her post-operative course was uneventful. At 3-month postoperative follow-up, she was doing well without cervical scar contracture and other complication.

DISCUSSION

The CMCC was first reported in 1848 by von Luschka⁸. It was published in the textbook of pediatric surgery by Ombredanne⁹ in 1949. Female is more predominant than male^{1,4,10}. The CMCC can be identified after birth, but it may be misdiagnosed that often caused inadequate treatment and complications^{6,7}.

The CMCC may be a solitary malformation, but it may have associated anomalies, such as thyroglossal duct cyst, ectopic bronchogenic cyst, branchial cleft cyst, midline hemangioma, cleft lip and other abnormalities of mandible, tongue, sternum, absence of hyoid bone and thyroid cartilage¹¹⁻¹⁴. Hirokawa¹⁵ reported CMCC associated with congenital heart diseases and the most serious anomaly with ectopia cordis.

Different theories have been proposed on the embryological origin of the CMCC. Most investigators believe that the defect is the result of fusion failure of

the first and second branchial arches in the midline^{10,12,15-17}. Mechanisms with relation to incomplete branchial fusion are vascular anomalies (ischemia, necrosis and scarring), increased pressure in the cervical area and absence of mesenchymal tissue in the cervical midline. Typical three anatomic parts of CMCC consist of skin tag at the superior end, linear vertical cleft in the middle part and small sinus tract at the inferior end. The superior skin tag may present with normal skin or thin stratified squamous epithelium with parakeratosis. The inferior sinus tract consists of pseudostratified columnar epithelium and dense collagen. Secretions may be noted from accessory salivary glands draining into the cleft^{4,10}.

The diagnosis of CMCC can be done by physical examination¹⁻⁵. The lesion locates in the anterior surface of neck, between the mandible and upper part of the sternum. It is a longitudinal cleft extending downwards. The superior end covered by red or pink moist surface of atrophic epidermis without adnexal structure. The inferior end of the cleft usually has a sinus tract with mucous discharge and it involves gradually in the first month of infancy period. Sometimes, the cleft spontaneously heals and has scar formation. It develops complications of neck contraction, limitation of neck extension and movement, or presence of torticollis in some cases^{6,7}.

Complete surgical removal of CMCC is suggested to perform before two years of age because of the cosmetic outcome and avoiding of secondary complications. The surgical technique has been reported using a series of Z-plasty, to avoid a contracting linear scar^{1,7,11-13,17}. From the literature review, some investigators advocated early surgical intervention before three months of age in order to prevent cosmetic deformity and complications, such as impairment of neck extension, mandibular deformity, torticollis and infection^{7,11}. This patient in the present study was diagnosed and surgically treated at the first month of life. Outcome of the surgical excision was satisfactory without any complication.

CONCLUSION

CMCC is a rare congenital malformation of the anterior midline of neck. It is important for neonatologists and pediatric surgeons to recognize this rare anomaly in neonate. Typical characteristics

consist of a linear vertical area of thin and erythematous mucosa at birth with a nipple-like projection in the upper end and a sinus tract at the lower end. Early definite diagnosis and surgical excision in the infancy period should be done in order to prevent secondary complications. The patient in this report was diagnosed and surgically treated within one month after birth. Her post-operative follow-up was good without any complication.

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บทคัดย่อ ความผิดปกติแต่กำเนิดที่พบคล้ายร่องตรงกลางคอ: รายงานผู้ป่วยหนึ่งราย

เยาวลักษณ์ คำนวน, พบ.

หน่วยกุมารศัลยศาสตร์ กลุ่มงานศัลยศาสตร์ โรงพยาบาลพุทธชินราช พิษณุโลก

ความผิดปกติแต่กำเนิดที่พบคล้ายร่องตรงกลางคอ เป็นความผิดปกติที่พบน้อยมากชนิดหนึ่ง ความผิดปกติชนิดนี้มักพบได้ตั้งแต่แรกเกิดด้วยลักษณะอาการที่มีผิวหนังตรงกลางคอด้านหน้านูนขึ้น เป็นติ่งคล้ายหัวนมอยู่ทางส่วนหัวของรอยโรคและมีรูเล็ก ๆ อยู่กึ่งกลางของร่องตรงกลางคอ โรคนี้สามารถได้รับการวินิจฉัยและรักษาโดยการผ่าตัดได้ตั้งแต่วัยทารก ผู้เขียนขอรายงานผู้ป่วยทารกเพศหญิงหนึ่งรายที่มีความผิดปกติดังกล่าว และผ่าตัดได้สำเร็จตั้งแต่ผู้ป่วยอายุหนึ่งเดือน เพื่อเป็นการแลกเปลี่ยนประสบการณ์ของโรคที่หายากนี้

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MINIMAL INVASIVE AND ROBOTIC SURGERY

WHAT IS THE APPROPRIATE THAI BODY MASS INDEX CUTOFF FOR OBESITY?

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Introduction: The World Health Organization (WHO) defines body mass index (BMI) more than 30 kg/m² as obesity. In some Asian population a specific BMI reflect a higher body fat percentage than European population. The percentage of body fat more than 30 for women and 25 for men are generally indicated obesity. This study aims to analyze the appropriated BMI for define the obesity cutoff in Thai population.

Methods: The total 258 obese Thai patients who visit in preoperative education class of bariatric surgery clinic were prospectively collected in King Chulalongkorn Memorial Hospital from 2013 to 2016. Patient data included weight, height, age and body composition measured by bioelectrical impedance analysis (BIA). We analyzed predicted BMI at 30% of body fat in women and 25% in men.

Result: There are 258 obese patients that age between 20 and 60 years old, included 118 men and 140 women. BMI of 222 patients (86%) were in class 3 obesity classifi-

cation (BMI 40 kg/m²) and 112 patients (43.4%) had BMI more than 50 kg/m². Linear regression analysis revealed the predicted men BMI were 30.7 kg/m² and 29.7 kg/m² in age range 20 - 40 and 41 - 60 years old respectively. For women were 26.9 kg/m² and 27.8 kg/m² in age range 20 - 40 and 41 - 60 years old respectively.

Conclusion: Body fat percentage is important parameter for classify the obesity patients and should be combined with BMI for improve the accuracy. In Thai population obesity definition would be change to BMI 27 kg/m² in men and 30 kg/m² in women.

COMPARISON BETWEEN LAPAROSCOPIC CHOLECYSTECTOMY BY HEM-O-LOCK CLIPS VERSUS METALLIC CLIPS: A PROSPECTIVE RANDOMIZED STUDY

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Background: The non-absorbable polymer clip offers a solution to the disadvantage of traditional metallic clip. Due to its metallic property, it is not only expensive but also causes artifacts on imaging studies and often migrates into CBD. This study compares the traditional standard metallic clip with Hem-O-Lock used in laparoscopic cholecystectomy (LC) in regard of the safety and efficacy.

Material and Methods: This study includes 40 patients who underwent LC implementing metallic clip (MC) and

40 patients implementing Hem-O-Lock clips (HC). Both clips were applied to cystic duct and artery, then the gallbladder was dissected from the liver bed by diathermy. The intraoperative and postoperative parameters were collected including duration of the operation and complications.

Results: The median operative time was not statistically different between the MC and the HC group (89.33 vs 86.17 minutes, respectively; $p = 0.96$) with no significantly less incidence of bile spillage (9 vs 8, $p = 0.956$). No statistically significant difference was found in the incidence of postoperative complications between both groups (1 vs 2, $p = 0.97$). No postoperative bile leakage was encountered in both groups.

Conclusion: Hem-O-Lock clip provides a complete hemobiliary stasis and a secure cystic duct and artery control. Its cost effectiveness is also attractive while provides efficacy equivalent to that of the standard metallic clip.

PREDICTIVE FACTORS FOR DIABETES MELLITUS TYPE II REMISSION AT 1 YEAR AFTER BARIATRIC SURGERY IN THAI POPULATION

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Background: Bariatric surgery is a choice for treatment in morbidly obese patients with Diabetes Mellitus (DM) type II who has inadequate control diabetes with medical treatment. DM type II remission after bariatric surgery has been reported from many studies. However, the predictive factors for remission after surgery are still inconclusive.

Objective: To identify the predictive factors for DM type II remission at 1 year after bariatric surgery in Thai population.

Material and Method: Retrospective study of patients with DM type II and morbidly obese patient who underwent bariatric surgery in King Chulalongkorn Memorial Hospital from September 2003 to March 2016 was analyzed. DM type II remission is defined as patients not requiring hypoglycemic medication and glycated hemoglobin (HbA1C) less than 6.0%.

Results: There were 413 patients underwent bariatric surgery, 109 patients were included in the study. Fifty-five patients were female (50.5%). Mean age 38.98 ± 11.00 years, mean body mass index was 51.1 ± 10.35 kg/m², and

mean pre-operative HbA1C was 7.59 ± 1.91 mg%. Sixty-six patients (60.6%) were underwent laparoscopic Roux-en-Y gastric bypass (LRYGB) and 43 patients (39.4%) were underwent laparoscopic sleeve gastrectomy (LSG). Twenty patients (18.18%) were use insulin. Nine patients (10.2%) were not use hypoglycemic drug. Mean patients weight loss after bariatric surgery was 19.36 ± 23.03 %. In univariate analysis, gender ($p = 0.13$) and pre-operative HbA1C ($p = 0.001$) may be factors for remission. Pre-operative HbA1C less than 7% resulted significant predictor of diabetes remission from multivariate analysis with p -value of 0.005.

Conclusion: Pre-operative HbA1C less than 7% is a predictive factor for diabetes remission after bariatric surgery in Thai patients.

ACUTE WEIGHT LOSS IN SUPER MORBID OBESITY; COMPARATIVE INTRAOPERATIVE FINDING

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Introduction: Nonalcoholic fatty liver disease is common among morbid obesity. An enlarged liver obscures the gastroesophageal junction and make completion of bariatric surgery difficult. In the past, we performed stage operation in super morbid obesity by laparoscopic sleeve gastrectomy first then after patient reduced some weight then we performed laparoscopic Rou-en-Y gastric bypass. When we introduced acute weight loss protocol, we performed single stage. Preoperative weight loss can reduce liver volume and facilitate operation.

Material and Method: In King Chulalongkorn Memorial hospital, we develop acute weight loss protocol that patient who has BMI more than 50 kg/m² eat 750 calorie/day for 7 - 14 days before operation. We review chart and video of patient who has BMI more than 50 and with or without acute weight loss before operation. Information gathered was analyzed for loss of weight, intraoperative of liver finding, operative time and complication

Result: Fifty one patients were reviewed. In non-acute weight loss group was performed laparoscopic sleeve gastrectomy (LSG) more than laparoscopic Roux-en-Y gastric bypass (LRYGB) (19:7). In acute weight loss group was performed LRYGB more than LSG (16:9). Acute weight loss patient reduced weight around 4 - 19 (mean 8.32) kilograms. Intraoperative liver finding was shown sharp

edge and can see stomach in acute weight loss group when compare to non-acute weight loss group and operation is success without intraoperative complication in both group.

Conclusion: Acute weight loss protocol is important to facilitate operation.

LAPAROSCOPIC VENTRAL MESH RECTOPEXY: STEP BY STEP

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Rectal prolapse is uncommon, however the true incidence is uncertain because of underreporting. Surgical intervention is the primary treatment of choice. The procedure can be split into two main approaches; abdominal and perineal. The aims of the operation are to correct the prolapse and to improve the continence or constipation. However over 100 different procedures have been described for treatment rectal prolapse.

There has been significant evolution in rectal prolapse surgery in recent decade. Currently there is no established consensus as the best surgical treatment. Laparoscopic approach has become increasing popular and several studies have shown the benefits when compared to open approach.

Currently the laparoscopic ventral mesh rectopexy with or without resection is the most common used technique. The recent data showed low recurrent rate, good functional result and low rate of complication.

In this video, we described a technique for laparoscopic ventral mesh rectopexy of rectal prolapse in a 77 year-old female in Bangkok Metropolitan Administration (BMA) General Hospital Bangkok, Thailand. This video demonstrates a technique for operative field setup, port placement, and step of operation.

ENDOSCOPIC THORACIC SYMPATHECTOMY IN PRIMARY HYPERHIDROSIS: HOW TO DO IT

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Introduction: The last choice of treatment for primary focal hyperhidrosis especially palmar and axilla area is Endoscopic Thoracic Sympathectomy (ETS). The patients suffered from their sweaty hands, axilla, and feet. Primary

hyperhidrosis is not a common disease and operation in Thailand as well. So, it is pretty hard to find the way to perform.

Objective: This video was conducted to be a guide for the surgeons how to perform Endoscopic Thoracic Sympathectomy with safety and effectiveness.

Method: The patient is 21 years old. He had excessive sweat both hands and feet for a long time. He had no other abnormal symptoms. After the investigation was done, he was diagnosed as primary palmar and plantar hyperhidrosis. He preferred ETS. The informed consent was obtained.

Results: ETS was performed successfully. The operative time was 40 minutes. There was minimal blood loss. He had no postoperative complications including pneumothorax, lung injury, or compensatory syndrome. His hands and feet became dry despite in the warm environment. He was satisfied with this operation.

Conclusion: ETS is the procedure which is not too hard to learn. Furthermore, it can help the primary hyperhidrosis patients have better quality of life.

EVALUATION OF LAPAROSCOPIC CHOLECYSTECTOMY SIMULATOR: RAJAVITHI HYBRID MODEL

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Introduction: Rajavithi hybrid model (RHM) was used in the training laparoscopic cholecystectomy. This study aims to evaluate face validity.

Material and Methods: Surgical residents were asked to perform RHM which consist of 1) training box with webcam camera inside the box connecting to computer and LCD display 2) rubber model resembled a real liver (RL) and duodenum, stomach (RS). There was a space inside RL enough to insert part of cadaveric pig liver (CL) and gallbladder (CG) and common bile duct (CCBD). When we wanted to use the organ just left the frozen organ outside refrigerator for 2 hours until it thawed. Each participant performed one cholecystectomy via this simulator. Face validity was evaluated with questionnaire.

Results: All participants had an experience in performing laparoscopic cholecystectomy (LC) in cadaveric pig. The operation on the RHM was realistic and also the degree of freedom in order to move instruments was realistic. The RHM was a useful training device.

Conclusion: RHM was all in one simulator that provided effective skill training in LC. The frozen part of pig organ (gallbladder, liver and common bile duct) made more realism and convenient to practice.

TIPS AND TRICKS FOR LAPAROSCOPIC TOTAL MESORECTAL EXCISION

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Background: Due to better local control and survival provided by total mesorectal excision for treatment of rectal cancer, it has been accepted as the gold standard for surgery of middle and low rectal cancer. Laparoscopic total mesorectal excision in rectal cancer is a technically demanding operation. The beginner usually struggle in many steps. The three essential tricks that the surgeon should keep them in mind while doing this operation are making of good coordinated counter-traction, recognizing the corrected dissection plane and recognizing the vital structures (ex. ureter, gonadal vessels, pelvic autonomic nerves, etc.).

Method: This video shows techniques and tricks to accomplish the laparoscopic total mesorectal excision. The steps are medial to lateral mobilization, inferior mesenteric artery ligation, lateral dissection of the left colon, rectal dissection to the pelvic floor and low anterior resection with stapled anastomosis. The positions of assistant's hands as well as the surgeon's left hand to make coordinated tractions are described in the figures. The vital structures and the corrected dissection plane were also demonstrated. This video will help you understand how to make the good laparoscopic total mesorectal excision.

Result: The laparoscopic total mesorectal excision could be simply performed in stepwise manner.

Conclusion: The keys to successful laparoscopic total mesorectal excision are making of good coordinated counter-traction, recognizing the corrected dissection plane and recognizing the vital structures.

LAPAROSCOPIC LYMPH NODE DISSECTION IN RECURRENT LEFT ILIAC LYMPH NODE

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Introduction: Locoregional recurrence after resection of colon and rectum carcinoma is an uncommon and difficult clinical problem. There is uncertainty regarding the management of this situation. Operative salvage of recurrent cancer is employed both to avert the morbidity of local tumor growth and prolong survival.

Presentation of Case: A 60-year-old man was diagnosed with recurrent CA rectum. Post operation Lap

LAR showed T3N2bM0. He received adjuvant chemotherapy XELOX for 8 cycles. In the cause of the treatment for about 20 months, CEA was rising to 10.4, normal colonoscopy, CT scan whole abdomen revealed left common iliac node enlargement (2 cm). PET/CT showed intense hypermetabolism of the left common iliac node, likely nodal metastasis.

Patient went on for laparoscopic lymph node dissection of the left iliac for treatment. The procedure was successful and patient fully recovered and was discharged in 3 days post operation.

Conclusion: Salvage surgery for locoregional recurrence colon cancer is appropriate for selected patients. Complete resection is critical to long-term survival. Laparoscopic iliac node dissection is feasible for case with recurrent lymph node metastasis.

ART OF LAPAROSCOPIC CHOLECYSTECTOMY: DEAL WITH DIFFICULT GALLBLADDER

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Introduction: Laparoscopic cholecystectomy (LC) is now considered the gold standard procedure for most gallstone disease. LC has clear advantages over open cholecystectomy with less pain and shorter recovery time. However, it has been associated with higher incidence of bile duct injury (0.2-0.3%). Bile duct injury can be a serious complication with increase mortality and decrease quality of life. Classic bile duct injury occurs when common bile duct is misidentification as the cystic duct especially in the setting of acute or severe chronic inflammation gallbladder. The difficult gallbladder requires follow to the Culture of Safety for Cholecystectomy to avoid difficult operative situations.

Methods: In every case of cholecystectomy; surgeon should be identified Rouviere's sulcus, hilar plate, cystic plate and porta hepatis to located the common bile duct and common hepatic duct that not be injured in the operation. The best approach of cholecystectomy is achieved the critical view of safety. Dissection of fibrous tissue in hepatocystic triangle and lower part of gallbladder are necessary. There are only cystic duct and cystic artery that entering to gallbladder. Should not clip or divided any structure before achieve critical view of safety.

Result: In simple cholecystectomy; the critical view

of safety can be achieved with standard 4 port incision but not easy in difficult gallbladder such as acute cholecystitis, contracted gallbladder, large stones within Hartmann's pouch, short cystic duct anatomy and in liver cirrhosis patient. Some instrument including 30-degree lens, saline irrigation, suction device and ligation instrument are useful. The key success is the critical view of safety and understand the potential for aberrant anatomy.

Conclusion: This video focus on safely performing LC and the maneuver to prevent complications in difficult gallbladder surgery. Success depends on multiple factors including operative indication, preoperative patient evaluation, anatomy of gallbladder and surgeon's skill. The practice, even during routine cases, is helpful to avoid the complications associated with this procedure.

ESSENTIAL VASCULAR ANATOMY FOR LAPAROSCOPIC COLECTOMY

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Laparoscopic surgery is the standard surgical treatment for colorectal cancer. Nowadays the principles of colorectal cancer surgery are complete mesocolic excision (CME) and central vascular ligation which provide the survival benefit to the patient. The knowledge about vascular anatomy is crucial for the surgeon to perform the operation safely without complication.

Here, the review of colorectal vascular anatomy, its variation and video presentation for laparoscopic view of

those vessels were shown.

For right sided colon and transverse colon. From literature review the ileocolic vessel is constant vessel with minimal variation so we use this vessel as the land mark for laparoscopic right hemicolectomy. Actually the right colic artery was found only 30 % of patients which was different from previous knowledge. The critical point to perform central vascular ligation for right sided and transverse colon cancer surgery is the central venous ligation around pancreatic neck. The vessels at this area especially colic vein have various variations which are difficult to be dissected and identified. There are reported incidence of superior mesenteric vein injury and exsanguination during the operation. The surgeon should know that the right colic vein almost present in 80% of patients and mostly drain into gastrocolic trunk. The middle colic artery is a constant structure which is originated from superior mesenteric artery. The middle colic vein usually has multiple tributaries.

For left sided colon and rectum, the knowledge of vascular anatomy allow surgeon to perform distal colorectal anastomosis safely with adequate blood supply to marginal artery dependent colon. In 5% of patients have no left colic artery and 7-10% of patients have incomplete marginal artery around splenic flexure (Griffith's point) which may be lead to compromise of blood supply to the marginal artery dependent colon. This situation makes the anastomosis jeopardy.

This video presents the literature review of colorectal vascular anatomy and laparoscopic dissection view of these vessels.

PEDIATRIC SURGERY

ACCURACY OF CALRETININ FOR DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE

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Background: Hirschsprung's disease is a developmental disorder characterized by the absence of ganglion cell in the intestine. Absent of nerve plexus cause imbalance of smooth muscle contractility, uncoordinated peristalsis and a functional obstruction. Gold standard diagnosis of Hirschsprung's disease is full thickness rectal biopsy with hematoxylin and eosin (H&E) stains which show absence of ganglion cell. Alternative method is rectal sectional

biopsy with acetylcholinesterase activity stain in frozen specimen and diagnosed by increased activity of acetylcholinesterase. Calretinin stain is now challenging due to less cost and can be done bedside by rectal suctional biopsy without frozen of the specimen.

Objectives: To study accuracy of calretinin stain for diagnosis of Hirschsprung's disease compared with gold standard method (H&E stain).

Materials and Methods: This prospective double blind diagnostic study was done between February 2015 and February 2017. Hirschsprung's patients in Maharaj Nakorn Chiangmai Hospital who underwent transanal endorectal pull through (TERPT) were included. The specimens were identified into 3 zones, ganglionic zone, transitional zone and aganglionic zone which randomly

sent to pathologist. Each specimen was stained with both H&E and calretinin. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), agreement and Kappa analysis were done.

Results: Forty patients (120 specimens) were included for analysis. The Hirschsprung's patients were 72 male (72.5%) and 11 female (27.5%) with average age of 8.2 months. From 120 specimens, we found that 94 specimens in H&E stain and 96 specimens in calretinin stain were positive for Hirschsprung's disease. Moreover, we found 26 specimens in H&E stain and 24 specimens in calretinin stain were negative for Hirschsprung's disease. The final analysis represented sensitivity 100%, specificity 92.3%, PPV 97.9%, NPV 100%, agreement 98.3% and Kappa 0.95 ($P < 0.001$).

Conclusions: Calretinin stain was found to be as accurate as H&E stain and could be used for diagnosis of Hirschsprung's disease.

SURGERY FOR ADRENAL TUMORS IN CHILDREN

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Objective: The objective of this study was to describe clinical data, operative findings and operative complications in children with adrenal tumors.

Methods: Patients, aged 0-15 years, undergoing adrenalectomy between January 2007 and December 2016 were retrospectively reviewed.

Results: Thirty-seven patients underwent adrenalectomies. Male to female ratio was 21:16. Median age of patients was 44 months (range: 2 months-14 years). Pathological examination revealed 27 adrenomedullary tumors (19 neuroblastomas, 5 ganglioneuroblastomas, 2 ganglioneuromas, and 1 pheochromocytoma) and 10 adrenocortical tumors (8 adrenocortical carcinomas, 1 adrenocortical adenoma, and 1 micronodular adrenal hyperplasia). Most patients (35/37) underwent open adrenalectomies.

For neuroblastomas, most patients were in stage 4. Two ganglioneuromas and one ganglioneuroblastoma were diagnosed and treated as neuroblastoma before adrenalectomy. Pre-operative median tumor-size was 6.3 cm. In neuroblastic cases, complete resection could be achieved in 54% (14/26). Post-operative complications were reported

in 19% (5/26) including chylous ascites, pancreatitis, and sepsis.

For adrenocortical tumors, all were functioning. Cushing syndrome (70%) is the most common presentation followed by precocious puberty (60%). Only one adrenocortical carcinoma patient presented with adrenal mass and lung metastasis. Most adrenocortical tumors exhibited hypervascularity. Median tumor-size was 6.3 cm (range 0.4 to 23 cm). Tumor with local invasion was found in 2 cases. No peri-operative complication was reported.

Conclusions: For adrenomedullary tumors, neuroblastoma stage 4 is the main indication for surgery in our series. This implies either delayed diagnosis or delayed medical attention. For adrenocortical tumors, surgical resection could be safely performed without significant morbidity.

FUNDOPLICATION FOR GASTROESOPHAGEAL REFLUX IN NEUROLOGICALLY IMPAIRED CHILDREN

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Objective: The aim of this study was to describe clinical data and outcome in children with neurological impairment who underwent fundoplication.

Methods: Patients (0-15 years) with neurological impairment undergoing fundoplication between January 2007 and December 2016 were retrospectively reviewed. The demographic data, surgical complications and short-term outcome were collected.

Results: Sixty-five patients (41 boys and 24 girls) underwent open fundoplication over the studied period. There were 21 infants (0-1 year, 32%), 41 children (1-10 years, 63%), and 3 adolescents (>10 years, 5%). The diagnosis of gastroesophageal reflux was based on impedance/24-hour pH monitoring (42%), gastric emptying scan (30%), esophagogram (18%), or endoscopy with biopsy (10%). Indication for fundoplication was refractory to medical therapy in all patients. Thirty-three (50%) of all patients already had gastrostomy performed at least one month prior to fundoplication. Surgical complications occurred in six patients (9.5%) including 3 wound infections (5%), two wrap failure (3%) and one splenic injury requiring splenectomy (1.5%). Median follow-up was 27 months. Outcome data were available in

50 patients. Thirty-five patients (70%) had clinical improvement, based on medical records or diagnostic tools. Redo-fundoplication was performed in 3 cases. All redo was in infancy group.

Conclusions: The majority of neurologically impaired patients had clinical improvement after fundoplication. Wound infection is the most common surgical complication. In addition, infancy was the age group risk for redo-fundoplication.

SURGICAL MANagements OF ANORECTAL MALFORMATIONS: 18-YEAR EXPERIENCE IN KING CHULALONGKORN MEMORIAL HOSPITAL

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Purpose: Various management strategies for anorectal malformations (ARMs) have been introduced. The aim of this study was to assess the operative managements at King Chulalongkorn Memorial Hospital over 18-year experience.

Method: A retrospective data were collected from the hospital from January 1998 till December 2016. Patients' information were classified according to the Krickenbeck classification. Associated anomalies, operative managements and complications were reviewed. Statistical analyses were performed using IBM SPSS statics 22 for MAC.

Results: A total of 96 patients underwent repair of ARMs. The most common ARMs in male patients was rectourethral fistula (32%) followed by rectovesical fistula (28%) and perineal fistula (21%). In female patients had vestibular fistula (43%) followed by cloaca (27%) and no fistula (14%). Seventy-five (78%) patients had at least one associated anomalies with renal (50%) and cardiac (31%) anomalies being the most common. Forty six patients (48%) had VACTERL association. Loop colostomy (57%) and double end colostomy (34%) were performed locating at sigmoid or descending colon (77%) while twelve patients' colostomy (16%) were located at transverse colon due to cloacal malformation and rectovesical fistula. ARMs with rectourethral fistula were underwent PSARP, abdomino-perineal operation (AP operation) or PSARP with laparotomy and all ARMs with rectovesical fistula were underwent AP operation. ARMs with perineal fistula were performed PSARP, ASARP or cut back operation depending on surgeon preference. ARMs with vestibular fistula were performed PSARP or ASARP. Mostly cloacal malformations had been treated with PSARVUP and abdomino-perineal

operation with total urogenital mobilization. ARMs with no fistula were performed PSARP and only one patient was underwent ASARP. All H-typed ARMs had been postponed the operation due to late detection and were underwent fistulectomy or ASARP with protective colostomy. All patients had performed routinely postoperative dilatation. Fifty-three patients (61%) had no postoperative complication even though eleven patients had redo-operations.

Conclusions: Surgical managements of ARMs in our study are highly variable. Prospective study and long term follow up are needed to provide evidence on outcome of the different surgical strategies.

SINGLE NUCLEOTIDE POLYMORPHISM WITHIN ADD3 GENE IS ASSOCIATED WITH BILIARY ATRESIA IN THAI INFANTS

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Background and Purpose: ADD3 has been recently suggested by a genome wide association study to have an association with biliary atresia (BA) in East Asian (Garcia-Barcello MM 2010). A validation study in Thai demonstrated disease association of XPNPEP1 (rs17095355) polymorphism in Thai (Kaewkiattiyot S 2011). This study is aimed to evaluate the BA association of single nucleotide polymorphism (SNP) in ADD3 gene a functioning area which is in the juxtaposition of XPNPEP1 Thai infants.

Methods: DNA from 37 cases of BA and 148 controls were genotyped for rs2501577 polymorphism (A/G), using quantitative polymerase chain reaction (qPCR) with Taq Man probe. Genotype distribution of the SNP was compared between the cases and the controls.

Results: Genotype distribution of rs2501577 SNP was within Hardy-Weinberg equilibrium for both BA and the control groups. Minor allele frequency of BA was higher than the controls (63.51%, 47.64%, $P=0.015$). Consistently, the homozygous minor allele genotype (GG) was found in BA in higher frequency than the control group (45.95%, 20.95%, $P=0.003$). On univariate analysis in recessive model, the GG genotype of ADD1 was a risk genotype for BA at the odds ratio of 3.21, 95% CI = 1.50-6.85.

Conclusion: According to the association between the rs2501577 and BA, GG genotype and G allele increase susceptibility to the disease. In addition, ADD3 gene may play an important role in pathogenesis of BA.

OUTCOMES OF TOTALLY IMPLANTABLE VENOUS ACCESS DEVICES IN PEDIATRIC CANCER PATIENTS: A SINGLE INSTITUTION EXPERIENCE

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Purpose: To review outcome of a totally implantable venous access device (TIVAD or Port-A-Cath) in pediatric cancer patients, focusing on longevity and complications.

Methods: Consecutive cases undergoing TIVAD implantation with a main purpose for chemotherapy during 2010-2016 were reviewed and analyzed.

Results: During the study period, 109 devices were implanted in 106 patients. Seventy five cases (68%) had hematologic malignancy and the rest had solid tumors. Sites of insertion were mainly subclavian (82 cases, 75%), followed by external jugular vein (15 cases, 14%) and internal jugular vein (11 cases, 10%) and a case of femoral

vein. Intra-operative and early complications occurred in 10 cases (9%), mostly displacement and malposition (4 cases) and arterial puncture (2 cases). Median follow-up time was 24 months. Of 109 devices, 48 have been removed, 18 after completion of cancer treatment, 15 due to complications and 15 removal after cancer death. In cases that a device has been removed after completion of treatment, average longevity was 948 days (range 186-1789 days). Excluding elective removal at the completion of treatment, 2-year overall survival and event-free survival of the line was 82% and 67%, respectively. Occurrence of catheter-related bloodstream infection and line occlusion were 0.2 events/1,000 catheter-days and 0.05 events/1,000 catheter-days, respectively. Diagnosis, side, site and surgical technique had no significant difference in the catheter outcomes.

Conclusion: Although TIVAD is a device that provides longterm reliable venous access for pediatric chemotherapy, it is not a complication-free procedure. Patient selection and refining surgical technique may help reducing the adverse outcomes.

PLASTIC & RECONSTRUCTIVE SURGERY

A PROSPECTIVE RANDOMIZED STUDY COMPARING TWO DIFFERENT METHODS IN PREOPERATIVE INFRAMAMMARY FOLD INCISION PLANNING FOR PRIMARY BREAST AUGMENTATION: HIGH FIVE VERSUS ICE PRINCIPLE

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Background: Breast augmentation is one of the most popular plastic surgeries in this decade. Understanding about what constitutes breast beauty is essential for those who carry out aesthetic breast surgery. A beautiful breast is beautiful in its lower pole which is an appearance of a perfectly formed youthful but natural breast. This bases on a 45:55 proportion principle and is universally recognized as attractive. There has been no study that offers the best method to determine the suitable site for inframammary fold incision in breast augmentation surgery.

Methods: 19 patients who wanted to do breast augmentation were enrolled and randomly allocated to one of the two study groups. Both breasts of patients in

Group 1 were treated with the high five technique to locate the incision while patients in Group 2 were treated with The ICE technique. The outcomes included both proportion and nipple angulation.

Results: 19 patient that enrolled in this study, there was no significant difference in demographic data $p = 0.88$. In 3-month post operation, The mean proportion in high five group is 51.7:48.3. In the ICE group, the mean proportion is 46.0:54.0. The mean varied proportion from target 45:55 in high five group is 5.25 and in ICE group is 1.0 but no significant different between two group at $p = 0.19$. The mean angulation in high five group is 2.72 skyward. In ICE group the mean angulation is 12.8. The mean varied angulation from target 20 degree skyward in high five group is 15.6 and in ICE group is 7.1 downward from target but no significant different between two group at $p = 0.19$

Conclusion: The ICE principle might be better than High Five technique about postoperative 3-month proportion but no significant difference in nipple angulation. Long-term follow-up is required to determine the most suitable measurement method for incision position.

THE EFFICACY OF SKIN COOLING FOR PAIN RELIEF DURING INTRALESIONAL STEROID INJECTION FOR KELOID: A RANDOMIZED CROSS-OVER STUDY

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Background: An intralesional corticosteroid injection is one of the most effective and the most popular treatments for keloid, however pain during injection is still the main drawback. This study aims to prove the efficacy of skin cooling for pain reduction during steroid injection.

Methods: A randomized cross-over study was conducted between September 2015 and October 2016. Forty-four subjects with keloid formation were recruited to receive 3 intralesional steroid injections with 3 different pre-injection anesthetic methods including no treatment, skin cooling with ice pack, and skin packing with a mixture of lidocaine 2.5% and prilocaine 2.5% (EMLA®), in random order. Pain intensity was measured by using 100-mm visual analogue scale (VAS). The satisfaction levels were evaluated by using an interval rating scale ranged from 1 to 5. Repeated-measure analysis of variance (ANOVA) and Bonferroni pairwise comparison were used for data analyses.

Results: The mean VAS score in skin cooling method was statistically significant lower compared to no treatment ($P < 0.001$) and EMLA method ($P < 0.05$) at the time of needle insertion into the skin and at the time during steroid infiltration. The satisfaction level was statistically significant higher in skin cooling method compared to no treatment ($P < 0.001$) and EMLA method ($P < 0.001$). Thirty-seven patients (84%) selected skin cooling method as the most favorable pre-anesthetic method for intralesional steroid injection.

Conclusions: Skin cooling effectively reduces pain during intralesional steroid injection for keloid treatment with high patient satisfaction.

COMPARATIVE ANTIMICROBIAL ACTIVITIES OF MANGOSTEEN-EXTRACTED WOUND DRESSING AND VARIOUS WOUND DRESSING AGAINST WOUND PATHOGEN IN BURNS: IN VITRO STUDY

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Background: Antimicrobial wound dressings are

worldwide used to prevent infection especially in burns. In Thailand, most of the wound dressings are imported and very expensive. Xanthone, bioactive substance, is extracted from the tropical fruit called mangosteen, agriculture economy of Thailand. There are many study supported antimicrobial activities of xanthone against bacteria, fungus and virus. In recently, Xanthone was made for the new antimicrobial agent on wound dressing. This study aims to compare antimicrobial activities of mangosteen extract dressing against common burn pathogens with other commercial wound dressings.

Method: Most common microorganisms those can be identified from burn wound in burn patient at King Chulalongkorn Memorial Hospital included *S. aureus*, *A. baumannii* (MDR), *E. faecalis*, *Paeruginosa* and *C. albicans* were used in this study. Antimicrobial activities against these pathogens were compared between Xanpad Germgard (mangosteen extract dressing), Acticoat, Askinacalgitol Ag, Aquacel Ag, Iodoflex and Bactigras in 3 different tests: zone of inhibition, time-kill assay and microbial transmission test.

Result: Zone of inhibition test showed Xanpad Germgard has wider clear zone than Iodoflex, silver dressing and Bactigras in all pathogens except *P. aeruginosa*. The result of Time-kill assay, Xanpad Germgard reduced the number of bacteria faster than Iodoflex, silver dressing and Bactigras in all pathogens except *P. aeruginosa* and continued effect along 24 hr. Reference to Microbial transmission test showed no viable microorganism on Xanpad Germgard dressing while other dressings have at least one time microorganism viable and can transmitted to other areas.

Conclusion: Xanpad Germgard has more potential to kill *S. aureus*, *A. baumannii* (MDR), *E. faecalis*, *C. albicans* than Acticoat, Askinacalgitol Ag, Aquacel Ag, Iodoflex and Bactigras except for *P. aeruginosa* and it is only one of all study dressings that showed no viable microorganism can grow up in 24 hours.

THE EFFECT OF THE LEDEMA LIGHT ON THE POST AUGMENTATION RHINOPLASTY EDEMA AND ECCHYMOSES: A DOUBLE-BLIND, RANDOMIZED, CONTROLLED TRIAL

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Background: Edema and ecchymosis are the major

concern following primary augmentation rhinoplasty. Aside from the meticulous technique and medications, it has been hypothesized that the phototherapy can reduce these problems.

Objective: This study was designed to prove the efficacy of the custom invented "LEDEMA Light" on enhancing recovery after rhinoplasty.

Material and Method: Twenty-two patients who underwent primary rhinoplasty were randomized into two groups, the sham light as the control group and the "LEDEMA light" (Illuminance (E) at 5 cm; LED 850 nm, 250 Lux and 490 nm, 510 Lux) group. Following rhinoplasty, each group was given the phototherapy 4 times: immediately, at 48 hours, day 4, and day 6. Four panelists rated the extent and color of the ecchymosis and the severity of edema at day 2, and the end of the first and second weeks post operatively.

Results: One male and twenty-one females participated in the trial, with ages ranging from 19-44 years (mean 26.6 ± 6.4 years). On post-operative day 2, there were no significant differences in the ratings of the extent and color of the ecchymosis and the severity of edema

among the groups. At 1 week post-operatively, the study showed the LEDEMA light group demonstrated a significantly lower score on the extent of the ecchymosis ($p = 0.017$) and the severity of edema ($p < 0.001$) when compared with the sham light group. There were no significant differences in the ratings of all aspects among the groups at 2 weeks. When the difference of ratings was considered between day 2 and 1 week, the LEDEMA light exhibited significantly more resolution of the extent of the ecchymosis ($p = 0.013$) and the edema ($p = 0.007$) compared with the control group but no significant difference between day 2 and 2 weeks. For the patients' subjective evaluation on pain at day 2 and the days to healing, both were significant superior in the LEDEMA light group compared to the control group, but no difference of satisfaction.

Conclusions: The study suggests that use of the LEDEMA light is effective in reducing the extent of the ecchymosis, edema, pain, and the days to healing after augmentation rhinoplasty. This innovation may be a helpful adjunctive treatment in the achievement of optimal results of cosmetic surgery.

TRAUMA AND BURN

EVALUATION OF THE IMMUNOGENICITY AND SAFETY OF EQUINE RABIES IMMUNOGLOBULIN IN OBESE PATIENTS WITH WHO CATEGORY III OF EXPOSURE

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Background: Correct post-exposure prophylaxis management without delay is highly recommended for severe rabies case, particularly in grade III severity of exposure, but suppressive effect of immunogenicity of rabies vaccine was reported in some studies. In this study, we hypothesized that high dose rabies vaccine might result in suppressing immunogenicity of rabies vaccine. The study was designed for evaluating suppressive effect and safety of Equine Rabies Immunoglobulin in obese patients compared to non-obese patients.

Methods: This is a single center, prospective cohort, open-label study. We included Thai females or males aged 18 years and above who were in WHO category III of rabies exposure and requires rabies post exposure treatment into

this study. Patients were categorized into two subgroups (BMI > 30 and BMI < 25). Each patient's blood was collected for antibody level analysis before immunization on days 0, 7, 14, and 28.

Results: Fifty-three enrolled adult patients had never been rabies vaccinated or incomplete post-exposure regimen. 25 patients had BMI > 30, 28 patients had BMI < 25. All patients were exposed by a bite from dogs and cats (65% vs. 35%). The lower limit of detection of antibody was 0.03 IU/ml, while the threshold for a positive result was more than or equal to 0.5 IU/ml, as naive sera can range between 0.07 and 0.46 IU/ml. 35% and 100% of patients in both groups have seroconversion, above 0.5 IU/ml, at day 7 and day 14, respectively. Mean antibody level on day 7 were 0.67 in non-obese group and 0.50 in obese group. No statistical significant was detected in antibody level between two groups. Only mild and transient local side effects were observed in 5 patients such as erythematous rash, pruritic, local reaction at injection site, and lip swelling (bitten site).

Conclusion: There was no evidence of immunogenicity suppression in obese group compared to non-obese group. This study was still preliminary due to incomplete number of patients in obese group. The complete data will be presented on the meeting day.

A RETROSPECTIVE ANALYSIS OF THE PATTERN OF MAXILLOFACIAL FRACTURES IN THE TRAUMATIC HEAD INJURY PATIENTS IN SONGKLANAGARIND HOSPITAL

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Objective: 1) To measure the incidence of the pattern of maxillofacial fracture in patient with traumatic head injury. 2) To measure the incidence of cause of injury, age and gender distribution

Methods: In this study, we evaluate all patients who presented with concomitant maxillofacial and traumatic head injury in Songklanagarind hospital between 2007 and 2016 to whom CT scans was obtained. Data will be collected from the medical records division by using search terms from ICD-10 version 2015.

Results: 859 patients included in the study consisting of 73.3% male and 22.7% female, and the male-to-female ratio was 3.4. Mean age was 39.5 years with a range of 18 to 91. 59% of the patients were between the age of 18-40 years. The most common causes of injuries were traffic accidents, accounting for 77%, followed by falls 8.1% and assault 6.8%. The severity of traumatic head injury was mainly mild traumatic head injury 70.1%, followed by severe 19% and moderate traumatic head injury 10.9%. 44.2% of the patients had used alcohol before the injury and alcohol consumption was significantly related to mild and severe traumatic head injury ($P < 0.05$). Of the total of maxillofacial fractured bones in 859 patients the most frequent was maxilla bone, orbital wall and nasal bone, representing 49.9%, 38.3% and 20%, respectively. The patients with mild traumatic head injury are significantly associated to coronoid process of mandible, Le fort fracture type II and type III ($P < 0.05$), moderate traumatic head injury are only significantly associated to coronoid process of mandible ($P < 0.05$) and severe traumatic head injury are significant associated to Le fort fracture type II and III. The most common hospitalization period was 1 day at 10.6% (the average period was 12.2 days). 33.9% patients were undergone the operation and 2.1% experienced post-operative complication.

Conclusion: The results of this retrospective study provided important data for the design of future planning for injury prevention. In this retrospective study, the most common cause found was traffic accident. The most common of the severity of traumatic head injury was mild traumatic head injury and the most fractures occurred in the age range of 18-40 years. The maxilla bone fracture was

the most frequent site involved. The patients with mild traumatic head injury are related to coronoid process of mandible, Le fort fracture type II and type III, moderate traumatic head injury are only related to coronoid process of mandible and severe traumatic head injury are related to Le fort fracture type II and III. Citizen awareness programs should be initiated. Legislation on preventive measures should be enforced and followed by every citizen.

THE STUDY OF FACTORS ASSOCIATED WITH DEVELOPING PNEUMONIA IN TRAUMATIC CHEST INJURY PATIENTS

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Background: Trauma is the second cause of death in Thailand, while chest injury found more than 10% of all trauma patients. Many studies reported the mortality from chest injury was about 4-20%. Risk factors of mortality in chest injury include age over 65 years old, rib fractures, underlying cardiopulmonary disease, and post chest injury pneumonia. Pneumonia was the only risk factor that was able prevent, as the evidence showed that the mortality of chest injury patients who developed pneumonia was nearly 4 times higher than that of patients without pneumonia.

Objective: To identify risk factors associated with developing pneumonia in trauma patients with chest injury, and to find incidence and incidence density of pneumonia in chest trauma patient who were admitted in Songklanagarind Hospital from 2013 to 2015.

Methods and Materials: The study design was a retrospective cohort. We reviewed the incidence of pneumonia in patients with chest injury who were admitted in Songklanagarind Hospital from 2013 to 2015. We collected data from hospital medical record Trauma Registry and information and technology division. We collected factors associated with developing pneumonia such as sex, age, ribs fracture, underlying diseases, Glasgow coma score and etc. This research used R and R studio statistic program to analyze data.

Result: The incidence of pneumonia in patient with chest trauma was 8.78% (49 in 570 patients). Incidence density of pneumonia showed that if we followed chest

trauma patients 100 cases in 10 days, they would develop pneumonia 4-8 cases. The multivariate analysis 4 factors are statistically significant, including Glasgow coma score 12, age 50 years and AIS scale at head, neck and chest region. The median of length of hospital stay in patient with pneumonia was 42 days (IQR 25-74 days) compared with the patient without pneumonia was 10 days (IQR 5-20 days) p -value < 0.001 , and median of days to develop pneumonia was 4 days, chest trauma patients who had 1 of 4 factors developed pneumonia 71.43% in 1 week, 89.80% in 2 weeks and 97.96% in 1 month.

Conclusion: The factors that associated with developing pneumonia in chest trauma patients are low GCS, age equal or more than 50 years and AIS scale of head, neck and chest region. So we should observe these in all chest trauma patients for proper management for pneumonia prevention.

INITIAL EMERGENCY DEPARTMENT HEMATOCRIT AS A PROGNOSTIC FACTOR OF FAILED CONSERVATIVE TREATMENT IN BLUNT SPLENIC INJURY, CHIANGRAI HOSPITAL EXPERIENCES

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Chiangrai Hoapital

Background: The appropriate management in blunt traumatic splenic injury (BSI) is currently non-operative treatment (NOM). However, there are many factors that made patients failed to conservative treatment. Initial emergency department hematocrit is easy and widely use in first visit. Nevertheless, there were few literatures of hematocrit level to appraise the patients who should be selected for NOM group.

Objective: The aim is to review the initial emergency department hematocrit may be a predictor for patients who failed conservative group.

Materials and Methods: A retrospective review of BSI patients in Chiangrai Hospital from November 2012 to October 2016. Primary outcome was to evaluate the hematocrit level for dividing patients to NOM. Secondary outcome was to discover other factors predicted patients in NOM. Statistical analysis was performed with adjusted odd ratio, student t -test, and Mann-Whitney test; statistical significance was $p < 0.05$.

Results: Total 145 patients were reviewed. Sixty-one patients (42.07 %) were treated as a conservative group. Mean hematocrit levels in NOM and operative group were not significantly different (33.13 VS 30.08; $p = 0.975$). Age, sex, head injury, and other solid organ injury were not different. ISS was significantly higher in operative group

compared with NOM (18.82 VS 13.28; $p < 0.001$). AAST imaging grade was not only significantly difference in operative group ($p = 0.007$), but also in presence of contrast extravasation group ($p = 0.002$). The cut point of hematocrit level was 33% significantly in univariate analysis (OR 2.20, 95% CI 1.12-4.32), but not statistically significant when evaluated with multivariate logistic regression (AOR 1.37, 95% CI 0.59-3.21). Secondary outcome was statistically significant factor included AAST imaging grade, presence of contrast extravasation, and ISS. Although the length of stay was not different, the mortality was significantly higher in operative group.

Conclusion: Initial emergency department hematocrit level cannot separate BSI patients into operative group or NOM. Although other factors included AAST imaging grade, presence of contrast extravasation, and ISS might be the factor which could be concerned to identify the patients who prone to failed NOM.

BENEFIT OF FLEXIBLE BRONCHOSCOPY IN POST-ENDOTRACHEAL INTUBATION OF INHALATION INJURY PATIENTS: A PRELIMINARY STUDY

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Objective: This study to evaluate benefit of flexible bronchoscopy in post-endotracheal intubation of inhalation injury patients in term of fewer day of mechanical ventilator.

Background: Inhalation injury has now become the most frequent cause of death in burn patients. Currently, early bronchoscopy is the best way for early diagnosis and being the best evidence to make decision for endotracheal intubation. Previous studies were demonstrated a relationship between severity of bronchoscopic finding and ventilator days. We hypothesis that early use of bronchoscopy after post-endotracheal intubation of inhalation injury patients can help physician decision to early extubation that lead to decrease in rate of ventilator-associated pneumonia and hospital stay.

Methods: A retrospective analysis of a single-center database from burn unit, Siriraj Hospital from 2011-2015 identified 37 patients diagnosis inhalation injury which 28 patient did not undergo bronchoscopy and 9 patients underwent bronchoscopy, we analyzed the data by age, race, gender, TBSA burn, hospital LOS, days of mechanical ventilation, number of bronchoscopies, ARDS, pneumonia and 28 days mortality

Results: There was no statistical difference in patient

characteristic and severity of both bronchoscopy group and non-bronchoscopy groups. Average time of bronchoscope post endotracheal intubation is 2.33 ± 2 days. No statistical significant of extubation date (4 (1, 6) days vs 8.5 (5, 13) days, P -value; 0.069), pneumonia (2 (22.2%) vs 10 (35.7%), P -value; 0.687), ARDS (0 (0%) vs 8 (28.6%); P -value 0.159) and mortality (3 (33.3%) vs 14 (50%); P -value 0.462) between bronchoscopy group and non-bronchoscopy groups.

Conclusion: Flexible bronchoscopy has no statistical significant to decrease incidence of pneumonia, ARDS, and mortality in management of inhalation injury. Flexible bronchoscopy may have trend to decrease day of mechanical ventilator.

COMBINING BLOOD LACTATE LEVEL WITH THE ASSESSMENT OF BLOOD CONSUMPTION SCORING SYSTEM: A MORE ACCURATE PREDICTOR OF MASSIVE TRANSFUSION REQUIREMENT

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Background: Exsanguination is the most common leading cause of death in trauma patients. A massive transfusion protocol (MTP) may influence therapeutic strategies and help to provide blood components in a timely manner. The Assessment of Blood Consumption (ABC) score is a popular MTP but has low predictability. The lactate level is a good parameter to reflect poor tissue perfusion or shock states that can guide the management. This study aimed to modify the ABC score by adding the

lactate level for better prediction of massive transfusion.

Methods: The data were retrospectively collected from 165 trauma patients following the trauma activated criteria at Songklanagarind Hospital from January 2014 to December 2014. The ABC score was applied to all patients. The patients who had an ABC score ≥ 2 as the cut point for the MTP were defined as the ABC group. All patients who had a score ≥ 2 with a lactate level > 4 mmol/dL were defined as the ABC+L group. Prediction for the requirement of massive blood transfusion was compared between the ABC and ABC+L groups. Categorical data were compared using Fisher's exact test. Normally distributed data were compared using analysis of variance. Logistic regression coefficients were used to measure the relationship between dependent and independent variables. The ability of the ABC and ABC+L groups to predict massive transfusion was estimated by the area under the receiver operating characteristic curve (AUROC).

Results: Among 165 patients, 15 patients (9%) required massive blood transfusion. There were no significant differences in age, gender, mechanism of injury or initial vital signs between the MTP group and the non-MTP group. The group that required massive transfusion had a higher Injury Severity Score and mortality. The sensitivity and specificity of the ABC score in our institution were low (81%, 34%, AUC 0.573). The sensitivity and specificity were significantly better in the ABC+L group (92%, 42%, AUC=0.745).

Conclusion: The ABC score plus lactate increased the sensitivity and specificity compared with the ABC score alone and the lactate level can be performed at the emergency department without any lost time.

TRANSPLANTATION

LIVER AND KIDNEY RETRIEVAL IN CADAVERIC BRAIN DEATH DONOR: STEP BY STEP

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Background: At present, solid organ transplantation is the best treatment of end stage organ disease. There are several components that lead to success in organ transplantation. Organ retrieval is one of the most important steps that influence the result of organ transplantation.

Objectives: This video shows the surgical technique of intraabdominal organ (liver and kidney) retrieval to ensure rapid and successful removal of organs with a

minimal risk of damage.

Materials and Methods: The surgical technique of intraabdominal organ retrieval is consisted of three main steps: preparation for cold perfusion, organ cold perfusion and cold dissection. The retrieval technique in this video is one of many options available.

Results: Liver and kidney graft can be retrieved from the brain death donor with minimal risk of surgical injury by technique in this video. The operative time can be shortened to about 2 hours that can be lessened ischemic time of the organ to promote the graft function after recipient operation.

Conclusions: One of the key to success in organ transplantation is organ retrieval technique.

UPPER GASTROINTESTINAL SURGERY

COMPARISON OF MICRONUTRIENT DEFICIENCIES FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS AND LAPAROSCOPIC SLEEVE GASTRECTOMY IN MORBIDLY OBESE PATIENTS

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Background: The prevalence of obesity is dramatically increasing as well as the bariatric surgery. Bariatric surgery is the most effective therapy for sustainable weight loss and improvement of obesity-related comorbidities. On the other hand, bariatric surgery can lead to micronutrient deficiencies such as vitamin B12, vitamin D, folate, and iron. It is important that early identification, appropriate treatment and routine prophylactic micronutrient supplementation are recognized as key components in the successful management of the bariatric patients.

Objective: To evaluate the prevalence of pre-operative micronutrient deficiencies and to compare nutritional status during the first post-operative year following laparoscopic Rou-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG).

Material & Methods: We conducted a retrospective analysis using data from patient records in all patients who underwent LRYGB and LSG from January 2012 to December 2015 in King Chulalongkorn Memorial Hospital. There are 175 patients with completed 1-year follow-up program after surgery by the same multidisciplinary team (surgeon, endocrinologist, and nutritionist). The primary outcomes were the prevalence of micronutrient deficiencies (vitamin B12, vitamin D, folate, and iron) in pre-operative and the first operative year. The secondary outcome was percent of excess weight loss (%EWL) at 1 year. Pre-operative deficiencies were supplemented and excluded from post-operative analysis.

Results: A total of 154 morbidly obese patients were underwent bariatric surgery with completed one year follow-up (74 patients in LRYGB, 80 patients in LSG). Pre-operative micronutrient deficiencies were found in 77 patients (75 vitamin D deficiency, 1 folate deficiency, and 1 iron deficiency) and showed no significant difference in both groups. Post-operative micronutrient deficiencies were found in 85 patients (18 vitamin B12 deficiency, 51 vitamin D deficiency, 5 folate deficiency, and 11 iron deficiency).

Only vitamin B12 deficiency were significantly higher in LRYGB group (20.3% vs 3.8%, $p = 0.001$). Others micronutrients showed no significant difference in both groups. Percent of excess weight loss (%EWL) at 1 year were significantly higher in LRYGB group (58.1 ± 21.4 vs 47.5 ± 22.9 , $p = 0.005$).

Conclusions: Micronutrient deficiencies are common metabolic complications. The high prevalence of micronutrient deficiencies following bariatric surgery makes life-long nutritional monitoring and supplementation essential.

PRE-TREATMENT ESOPHAGEAL WALL THICKNESS ASSOCIATED WITH RESPONSE IN PATIENTS WITH T3 LOCALLY ADVANCED SQUAMOUS CELL CARCINOMA OF ESOPHAGUS

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Objectives: A multimodality approach using combined chemoradiotherapy with and without surgery has been advocated as a curative treatment in patients with locally advanced esophageal squamous cell carcinoma. Computed tomography (CT) is widely utilized to evaluate esophageal cancer before and after treatment. This study will evaluate the utility of pretreatment maximal esophageal wall thickness on CT scans to predict the response to chemoradiotherapy and treatment outcome in patients with locally advanced esophageal squamous cell carcinoma.

Methods: Eighty-one patients with T3 locally advanced esophageal squamous cell carcinoma, whom were treated completely with chemoradiotherapy with and without surgery, and had available CT scans before and after treatment at Songklanagarind hospital between 2005-2015, were retrospectively reviewed. Of these 81 patients, 20 (25%) patients had esophagectomy after neoadjuvant chemoradiotherapy and 61 (75%) patients had definitive chemoradiotherapy. The maximal primary tumor/esophageal wall thickness were measured retrospectively and correlated with the response to chemoradiotherapy, treatment and survival outcome. The percentage decrease of the maximal thickness after chemoradiation was calculated by the formula: $[(\text{pre CRT} - \text{post CRT}) / \text{pre CRT}] \times 100$.

Results: Pre-treatment maximal esophageal wall thickness and percent of decrease were not significantly correlated with overall survival. Univariate analysis

demonstrated that neoadjuvant chemoradiotherapy followed by esophagectomy provided better survival when compared with definitive chemoradiotherapy (median survival 51 months vs 14.5 months; HR 0.46; 95%CI 0.25-0.85; $p = 0.01$). Pretreatment esophageal wall thickness of the T3 locally advanced esophageal squamous cell carcinoma < 17 mm was correlated with pCR ($p = 0.01$).

Conclusions: Pretreatment esophageal wall thickness of the T3 locally advanced esophageal squamous cell carcinoma ≥ 17 mm did not achieve pCR after adjuvant chemoradiation. Pretreatment esophageal wall thickness could not be used to predict treatment outcome of definitive chemoradiation. Neoadjuvant chemoradiation followed by esophagectomy provided significant better survival outcome than definitive chemoradiotherapy.

CLINICAL PRESENTATIONS, CHARACTERISTICS AND TREATMENTS OF ESOPHAGEAL CANCER: AN ANALYSIS OF CHULALONGKORN ESOPHAGEAL CANCER DATABASE

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Background: Esophageal cancer is the sixth leading cause of cancer death worldwide. In Thailand, it is the ninth rank of common cancer, and the fourth in male. However, there has been lack of general data for overall picture of esophageal cancer in the country. To improve the overall treatment outcome, information regarding demographic data, tumor characteristics, staging and overall treatment outcome are needed. The aim of this study was to evaluate the presentation, patient and tumor characteristics, providing treatments and their outcome of

esophageal cancer patients in university hospital of Thailand.

Methods: Patient who diagnosed esophageal and esophago-gastric junction (EGJ) cancer between 2006 and 2016 in King Chulalongkorn Memorial Hospital were retrospectively reviewed. Patients' demographic data, tumor characteristics, tumor staging, treatment and survival outcome were evaluated.

Results: A total of 380 patients diagnosed of esophageal or EGJ cancer were included. The majority of them were male (86.8%) and the mean age was 59.6 years. The presentation symptom was liquid dysphagia in the majority of patients (87.2%). The mean weight loss was 8.8kg. The mean duration of symptom was 2.8 months. The frequency of squamous cell carcinoma was 93.0% and adenocarcinoma was 7%. The most common tumor location was mid thoracic (46.2%). The majority of patients were presented in advanced stage (clinical stage III 65.5% and stage IV 24.2%). Treatments included definitive chemoradiation (dCRT) in 50.3%, neoadjuvant chemoradiation (nCRT) in 25.4%, palliation in 16.5% and primary esophagectomy in only 7.8%. About 50% of patients with dCRT had clinical response. Approximately half of the patients who were treated by neoadjuvant chemoradiation underwent esophagectomy as planned. R0 resection was 86.5%, pathological complete response rate was 42%, 90-day mortality rate was 1.92% and overall 5-year survival was 32% in nCRT patients.

Discussion: The most common type of esophageal cancer in Thailand is squamous cell carcinoma. The majority of patients present with advanced stage and severe malnutrition. Definitive chemoradiation is the most common type of treatment with approximately 50% has clinical response. Patients undergoing R-0 resection after nCRT have the best survival outcome.

UROLOGY

THE ASSOCIATION BETWEEN THE OUTCOMES OF EXTRAPERITONEAL LAPAROSCOPIC RADICAL PROSTATECTOMY AND THE ANTHROPOMETRIC MEASUREMENTS OF THE PROSTATE BY MAGNETIC RESONANCE IMAGING

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Introduction and Objective: The aim of this study was to determine the association between the anthropometric measurements from magnetic resonance imaging (MRI) and perioperative outcomes of extraperitoneal laparoscopic radical prostatectomy (ELRP).

Methods: From 2008 to June 2016, 86 patients underwent preoperative MRI prior to undergoing ELRP for localized prostate cancer by the same urologist (SP).

For the anthropometric measurements of MRI, two individual radiologists (SA and TV) measured prostatic volume, angle between pubic bone and prostate, depth of prostatic apex, curve distance, the angle between the prostate and pubic bone, abdominal wall thickness, work space AP and transverse during surgery, protrusion of the prostate into the bladder, retropubic fat and peri-prostatic plexus diameter. We analyzed the associations between anthropometric measurements and patient demographics, operative time, estimated blood loss, and positive surgical margins (PSMs), complication rate, and postoperative hospitalization.

Results: The mean patient age was 69.61 ± 8.30 years. The medians of operating time and blood loss were 2.30 (IQR = 2.69.; (Q3-Q1) = 6.86-4.18) hours and 725.30 (600; 900-300) ml, respectively. The total post-surgical complication rate was 1.16%. The median hospital stay was 6.50 days (4; 9-5). The pathological stages for T2 and T3 were 45.74% and 34.04%, respectively. The rate of PSMs was 18.09% (pT2 and pT3; 6.38% and 9.57%). For the association between the anthropometric measurements of the MRI and perioperative outcomes of ELRP, the angles between pubic bone and prostate gland (angle 1 & 2), were significantly associated with operative time and hospital stay, respectively ($p < 0.05$). There was no correlation between the pelvimetry and positive surgical margin.

Conclusions: The findings of the present study suggest that anthropometric measurements of the MRI were related to operative difficulties in ELRP. This study confirmed that MRI planning is the key to preventing complications in ELRP.

COMPARISON OF 3-MONTH RECURRENCE RATES AFTER WHITE-LIGHT VERSUS NARROW-BAND IMAGING TRANSURETHRAL RESECTION FOR NON-MUSCLE INVASIVE BLADDER CANCER: A PROSPECTIVE, RANDOMIZED CONTROLLED TRIAL

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Background: Narrow-band imaging (NBI) is a new imaging modality that filters white light into short bandwidths of blue light (415 nm) and green light (540 nm). This technology was developed to enhance the detection and visualization of bladder cancer. For this reason, a transurethral resection of a bladder tumor (TUR-BT) with NBI may reduce the 3-month recurrence rate when compared to a TUR-BT with standard white light imaging (WLI).

Objectives: To evaluate the 3-month recurrence rate of NBI TUR-BT versus WLI TUR-BT for the treatment of non-muscle invasive bladder cancer (NMIBC) in the Thai population.

Methods: A randomized, controlled trial of 123 patients who were suspected to have NMIBC was conducted from January 2015 to August 2016. The patients were randomized into standard WLI TUR-BT and NBI TUR-BT groups. Surveillance cystoscopy and urine cytology were evaluated at the 3-month follow-up period. The patients' baseline characteristics, cancer-free rates, and complications were recorded.

Results: Eighty-three TUR-BT were excluded due to the following: a synchronous upper urinary tract tumor; post-operative intravesical therapy before surveillance; a tumor too large to complete resection; a tumor that was a benign lesion; muscle invasive disease; and loss of follow-up patients. A total of 158 TUR-BTs were performed during the study period. After exclusion, there were 44 NBI TUR-BTs and 31 WLI TUR-BTs, respectively. The mean age at enrollment was 75 years in the NBI TUR-BT group and 66 years in the WLI TUR-BT group. Tumor characteristics and complication rates were similar in both groups ($p = 0.15$ and 0.692 , respectively). After the 3-month follow-up period, the recurrence rate was 31.8% (11 of 44 patients) in the NBI TUR-BT group and 61.3% (19 of 31 patients) in the WLI TUR-BT group ($p = 0.011$).

Conclusion: This is the first study of NBI TUR-BT in the Thai population. The results demonstrated that using an NBI TUR-BT has significantly reduced recurrence rates at three months after a TUR-BT for NMIBC and has comparable post-operative complications when compared to WLI TUR-BT.

VASCULAR SURGERY

FOREARM REINFORCED PTFE VS NON-REINFORCED PTFE ARTERIOVENOUS GRAFT FOR HEMODIALYSIS ACCESS

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Objective: This study evaluates effects of graft type on 6-month primary patency, cannulation attempts, duration from creation of the access to first cannulation, hemostatic compression time and satisfaction level from hemodialysis nurses

Methods: 60 patients diagnosed with end-stage renal disease suitable for forearm arteriovenous graft formation at Ramathibodi hospital were randomized to Non-reinforced and Reinforced PTFE graft access group. Demographic data were collected. Questionnaires were sent to hemodialysis nurses whom in-charge for access cannulation. The questionnaires include date of cannulation, cannulation attempts on each hemodialysis session, experience of hemodialysis nurse, hemostatic compression time and satisfaction scores for the access in the first month of hemodialysis. Post-operative follow-up were arranged and the patients were assessed for thrill, forearm circumferential at 2-, 4-week and complications.

Results: No differences in forearm circumferential at preoperative, 2- and 4-week postoperative between the 2 groups. The Reinforced PTFE group shows non-inferiority comparing to non-reinforced PTFE group in term of 6-month primary patency (100% vs 100%). The reinforced PTFE group shows shorter time of first cannulation (22 vs 31.5, $p < 0.05$), cannulation attempts (1 vs 1.1, $p < 0.05$), compression time (5.64 vs 7.61, $p < 0.05$). Experience does not affect cannulation attempts on Reinforced PTFE group.

Conclusions: Reinforced PTFE graft has shorter duration to first cannulation, easier for cannulation and compression with comparable 6-month primary patency and complication rate.

EFFICACY OF VENOUS THROMBOEMBOLISM PROPHYLAXIS IN THAI PATIENTS UNDERGO PELVIC CANCER SURGERY: RANDOMIZED CONTROLLED TRIAL

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Objective: Pelvic cancer surgery has a high risk for venous thromboembolism (VTE) and major bleeding complications. VTE prophylaxis is not routinely used. However, American College of Chest Physicians guideline recommends mechanical prophylaxis until bleeding risk is minimized then pharmacologic prophylaxis is initiated. We evaluated the efficacy of VTE prophylaxis in pelvic cancer surgery.

Methods: A total of 108 cancer patients including 70 gynecologic and 38 urological patients. They were randomized to prophylaxis and control groups. In prophylaxis group, intermittent pneumatic compression (IPC) was applied at least 3 days until full ambulation. Enoxaparin (0.4 ml subcutaneous daily) started after drain removal or after the discharge until 4 weeks postoperatively. In control group, patient was not received VTE prophylaxis as general practice. Deep vein thrombosis (DVT) was detected by duplex ultrasound and manifestation of pulmonary embolism (PE) were recorded at 7-14 days and 28-31 days postoperatively. The primary outcome was risk reduction of asymptomatic proximal DVT with VTE prophylaxis.

Results: Overall incidence of asymptomatic proximal DVT was 2.8% in all patients (three gynecologic patients); 3.7% in control and 1.9% in prophylaxis groups after surgery ($p = 1.000$). Relative risk reduction was 50%. In subgroup analysis of gynecologic patients, incidence of DVT was 6.5% in control and 2.6% in prophylaxis groups ($p = 0.580$). Relative risk reduction was 60%. Symptomatic PE was not found. Bleeding complications developed in two patients (wound hematoma and vaginal stump

bleeding)

Conclusions: The incidence of VTE tends to decrease after the implementation of recommended prophylaxis and risk of postoperative bleeding is acceptable, so VTE prophylaxis may be benefit in pelvic cancer surgery that should be considered in surgical practice.

COMPARISON OUTCOMES OF ENDOVASCULAR STENT GRAFT IN TREATMENT OF ABDOMINAL AORTIC ANEURYSM WITH SEVERE PROXIMAL NECK ANGULATION VERSUS NON-SEVERE NECK ANGULATION

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Objective: This study sought to evaluate long term outcomes after EVAR in severe proximal neck angulation abdominal aortic aneurysms versus abdominal aortic aneurysms (AAA) without severe angulation, including both AAA-related and all-cause mortality.

Background: Angulated proximal aneurysm neck of abdominal aortic aneurysm was once believed to be obstacle for EVAR which may cause adverse outcomes. However, from previous studies conducted, which demonstrates EVAR may be used in such patients. While these studies follow patients short to intermediated-term after the surgery, the information of long term outcomes are still lacking. We aim to investigate the influence of angulation on long term results when using EVAR.

Methods: A retrospective analysis of a prospective single-center database identified 54 patients treated with the EVAR stentgraft with severe angulation of the proximal neck, which were compared to 144 patients (control group) without significant proximal neck angulation. Endpoints were 3-years survival rate and re-intervention free proportion, differences in operative details and post-operative complication.

Results: Mean age of angulated patient was 77 ± 6.3 years versus 74 ± 7.9 years in another group. Mean proximal angle of severe angulated group was 82° while another was 13.50° . At three years, the of all-cause mortality was comparable between each group (63.0% vs 67.3%, *P*-value 0.437). While re-intervention free proportion up to three years were also comparable (91.2% vs 89.1%, *P*-value 1)

Conclusions: Treatment with the EVAR in severe proximal neck angulation abdominal aortic aneurysm is

technically feasible and safe, results in angulated and non-angulated anatomies alike. Apart from other aneurysmal anatomical characteristics, longer follow-up data are awaited to be studied furthermore, but 3-year survival and re-intervention rate are promising and help supporting in further uses of these stent grafts.

FACTORS AFFECTING OUTCOME OF ENDOVASCULAR STENT TREATMENT IN INFECTED AORTIC ANEURYSMS

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Introduction: The infected aortic aneurysm is rare disease but high fatality. Making diagnosis needs high index of suspicious and the treatment is still challenge. Over ten years, Endovascular aneurysm repair (EVAR), a favorably alternative treatment of infected aortic aneurysm due to feasible and lower mortality rate, has become standard management in Songkhlanagarind hospital. However, factor affecting mortality rate in endovascular treatment is still questionable. Aim of this retrospective case cohort is to identify risk factor of EVAR treatment in infected aortic aneurysm in Songkhlanagarind hospital.

Method: A retrospective cohort single-center population base study in Songkhlanagarind Hospital, reviewed from 1st September 2005 to 31th December 2015. A total 80 infected aortic aneurysm patients treated by endovascular technique. Lifelong antibiotics were planned for all patients. In hospital, short term and long term mortality were analyzed. Cause of death, peri-operative and late complication were identified. Univariate and Cox-regression analysis were applied for risk factor affected fatality.

Result: A total of 80 patients and 91 infected aneurysms were included in the study. Mean age was 64 years (range 53-75), 60 (75%) were men, 40 (50%) were immunodeficiency, 67 (83.8%) presented with pain. 12 (15%) presented with clinical fistula. 19 (23%) were positive blood culture. There were 10 (53%) gram negative organisms. The most common aneurysmal site was infra-renal type (53%). Post-operative complication was occurred in 48 (60%) cases, 20 (41.6%) developed in-hospital complication and 34 (70%) in first year. The complication was procedure related 43.6%, 7 cases required re-operation, 5 from procedure related and 2 from infection. Mortality rate were 18.8%, 9 (60%) in hospital and 11 (73%) in first year. 5/12 (41%) with fistulous presentation died. And 10/68 (14%) without fistulous presentation died. Most cause of death was sepsis 8 (53%). Univariate analysis demon-

strated age, clinical fistula at the presentation, shock, oral antibiotics after surgery, developing complication in the same admission, aneurysm complication and infection in the same admission were significantly factors. Multivariate analysis found only three factors. Continued oral antibiotics is protective factor (HR 0.998, 95%CI 0.996-1, P -value 0.003). Developing infection complication in the same admission is risk of death (HR 9.77, 95% CI 2.82-33.89, P -value < 0.001) and aneurysm complication is also risk factor (HR 8.94, 95% CI 1.65-48.82, P -value 0.011).

Conclusion: The endovascular treatment in infected aortic aneurysm provide simply and favorable in long term outcome. The infection in the same admission and aneurysm complication are related fatality. Life-long oral antibiotics demonstrate protective death.

FACTORS INFLUENCING OUTCOME OF SURGERY FOR CAROTID ARTERY STENOSIS AT THE BANGKOK HEART HOSPITAL

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Objective: To identify factors that influence the outcome of carotid endarterectomy (CEA) for carotid artery stenosis.

Methods: Between September 2001 and March 2017, 144 consecutive carotid artery stenosis patients underwent CEA. Mean age was 69.0 ± 9.0 years. Male was 122 (77.8%). Twenty two asymptomatic patients (15.3%) had CEA for primary prevention. In symptomatic patients, most common presentation was stroke (49/122, 40.2%). Second was dizziness (44/122, 36.1%). Transient ischemic attack (TIA) was found in 15.6% (19/122). Ten patients (8.2%) had amaurosis fugax (transient monocular blindness). Nine percent was current smoker. Diabetes, hypertension, recent stroke (within 2 weeks) were found in 50%, 87.5% and 11.1%, respectively. Degree of carotid stenosis at the operated site was $81.9 \pm 12.1\%$. Contralateral stenosis of carotid artery stenosis, more than 50%, was found in 42.3% of patients. Intraluminal shunt was used in 80.6% during procedure. Combined CEA and coronary artery bypass grafting (CABG) was performed in 13.9% of patients. All of the measured variables (age, gender, diabetes, hypertension, recent stroke, percent of carotid stenosis, contralateral carotid stenosis, combined CEA with CABG procedure, intraluminal shunt during CEA) were used in a multivariate logistic regression analysis to determine predictors of postoperative stroke or adverse outcomes.

Results: Thirty-day TIA and stroke rate were 0.7% (1/144) and 2.1% (3/144), respectively. Postoperative delirium was found in 1.4% (2/144). Thirty-day mortality rate was 1.4% (2/144). Combined endpoint (delirium, TIA, Stroke, death) was 5.6% (8/144). The predictors of postoperative stroke or adverse outcomes (delirium, TIA and death) were gender ($P = 0.036$), percent of carotid stenosis ($P = 0.013$) and combined CEA with CABG procedure ($P = 0.028$).

Conclusions: Carotid endarterectomy is a safe for treatment of cerebrovascular insufficiency. Special care should be taken to avoid postoperative stroke or adverse outcomes in female patients, patients with high grade carotid artery stenosis and patients undergoing combined CEA with CABG.

OUTCOME OF PERCUTANEOUS MECHANICAL THROMBECTOMY COMPARE WITH CATHETER DIRECTED THROMBOLYSIS IN ACUTE AND SUBACUTE LOWER LIMB ISCHEMIA

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Background: Catheter based therapy is standard treatment for acute and subacute lower limb ischemia with Rutherford class IIa and IIb. Besides catheter directed thrombolysis (CDT), percutaneous mechanical thrombectomy (PMT) is a novel treatment that can remove thrombus faster with less complication. However, no previous study compared the treatment outcome between PMT and CDT.

Objective: To compare treatment outcomes between PMT and CDT. Primary outcome is limb salvage and amputation rate. Moreover the complication, operative time, number of operation, time to lysis, complete clot removal technical success, length of intensive care unit (ICU) stay and hospital stay were recorded as secondary outcomes.

Materials and Methods: Retrospective chart review of acute and subacute lower limb ischemic patient with severity Rutherford class IIa and IIb from November 2014 to April 2017. We included all of patient treated with PMT and 22 patients treated with CDT based on the similarity of level and severity into our study. This ratio was 1:2 in line with head-to-head comparison method to empower the

result.

Result: Thirty-four patient were enrolled in this study. 12 patients were allocated to PMT group and 22 patients were allocated to CDT group. There was no significant difference between in demographic data and severity of ischemia, except etiology that we found more thrombosis in PMT group (72.7% vs 33.33%, $p = 0.04$), perioperative amputation rate was no difference (0% vs 4.8%, $p = 0.656$) and limb salvage at 3 month was comparable between two groups (80% vs 80%, $p = 0.751$). Next, there are more technical success (100% vs 85.7%, $p = 0.268$) and

complete clot removal (87.1% vs 57.1%, $p = 0.2$) in PMT but no statistical significant. Moreover, PMT group need less dose of rtPA (0 vs 30 mg, $p = 0.001$), number of operation (1 vs 3 times, $p = 0.002$). Only minor bleeding was found in 2 PMT patients. On the other hand, we found 5 patients had minor bleeding and 1 patient had major bleeding in CDT group.

Conclusion: We found comparable limb salvage and amputation rate between PMT and CDT group. Furthermore, PMT had benefits of reducing the need of thrombolysis, operative time and bleeding complications.

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