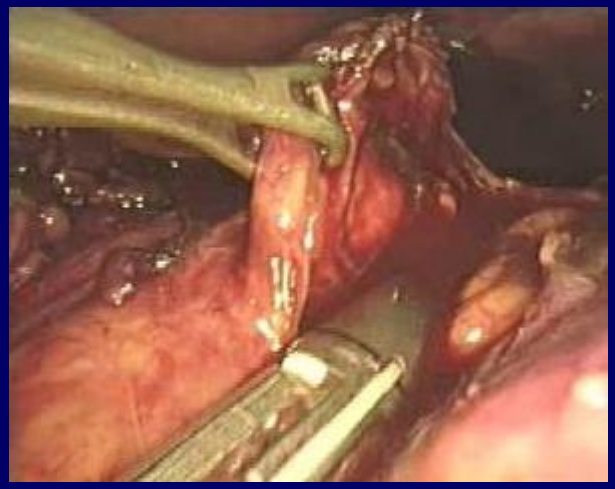
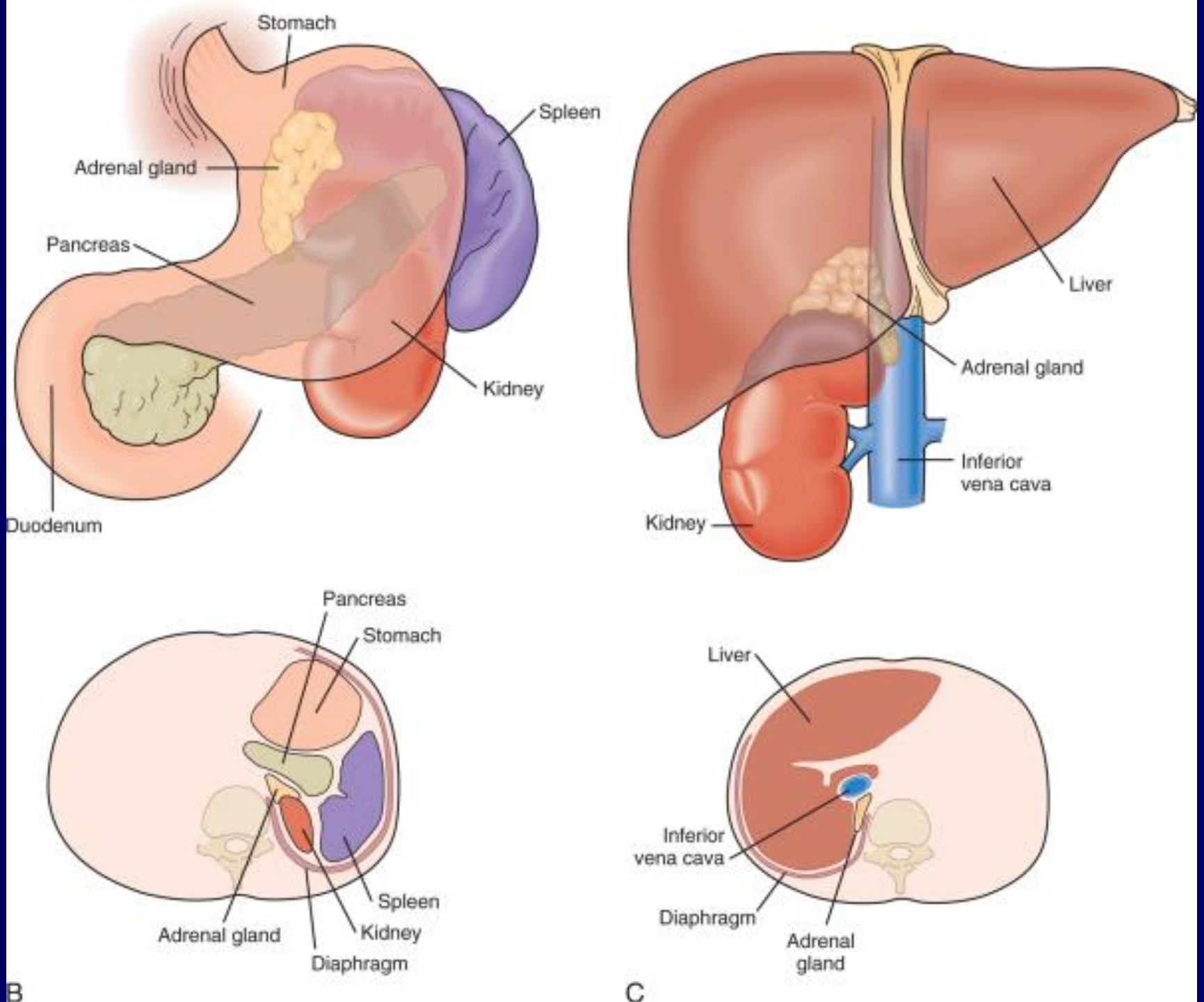


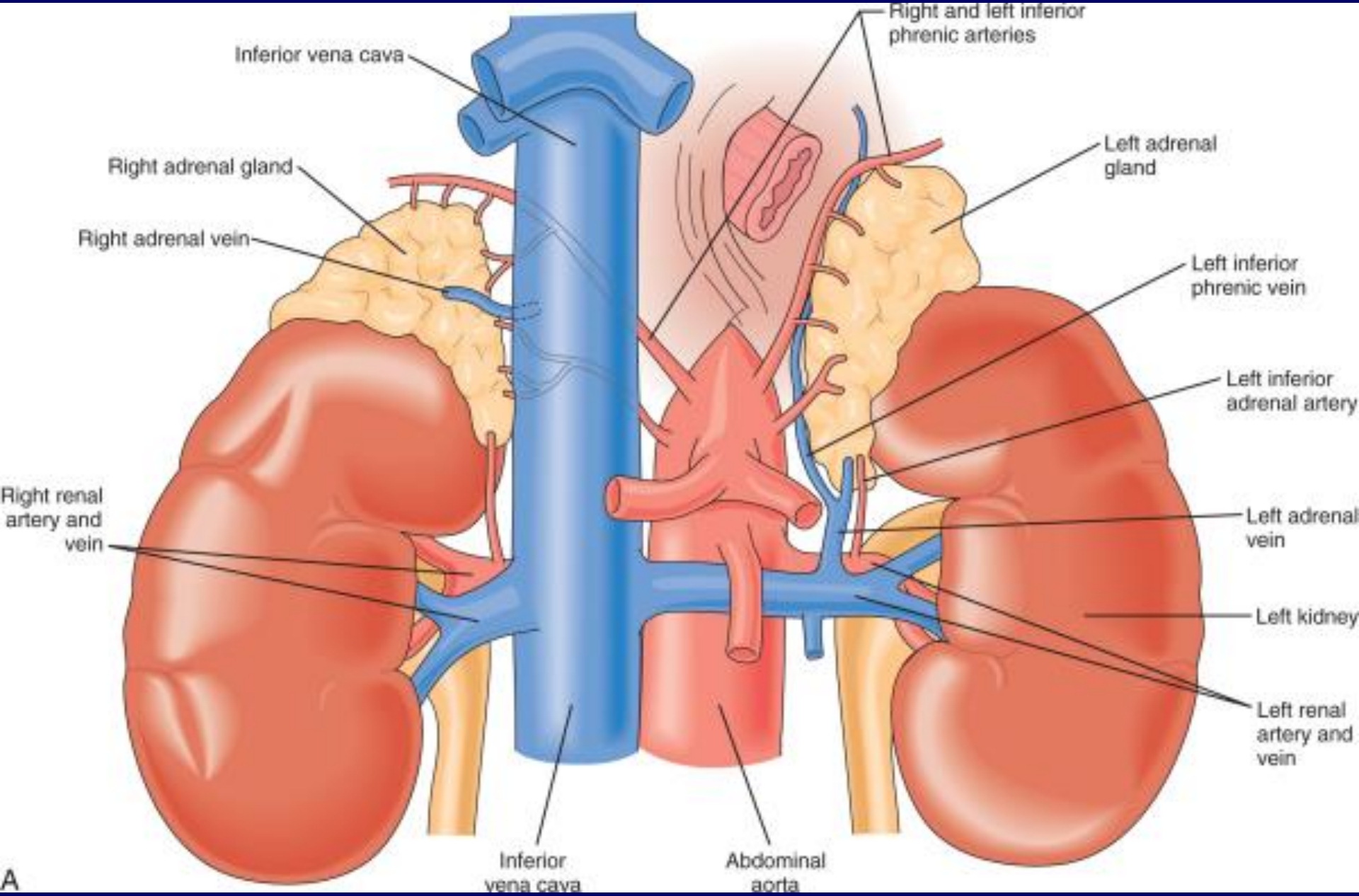
LAPAROSCOPIC BILATERAL ADRENALECTOMY

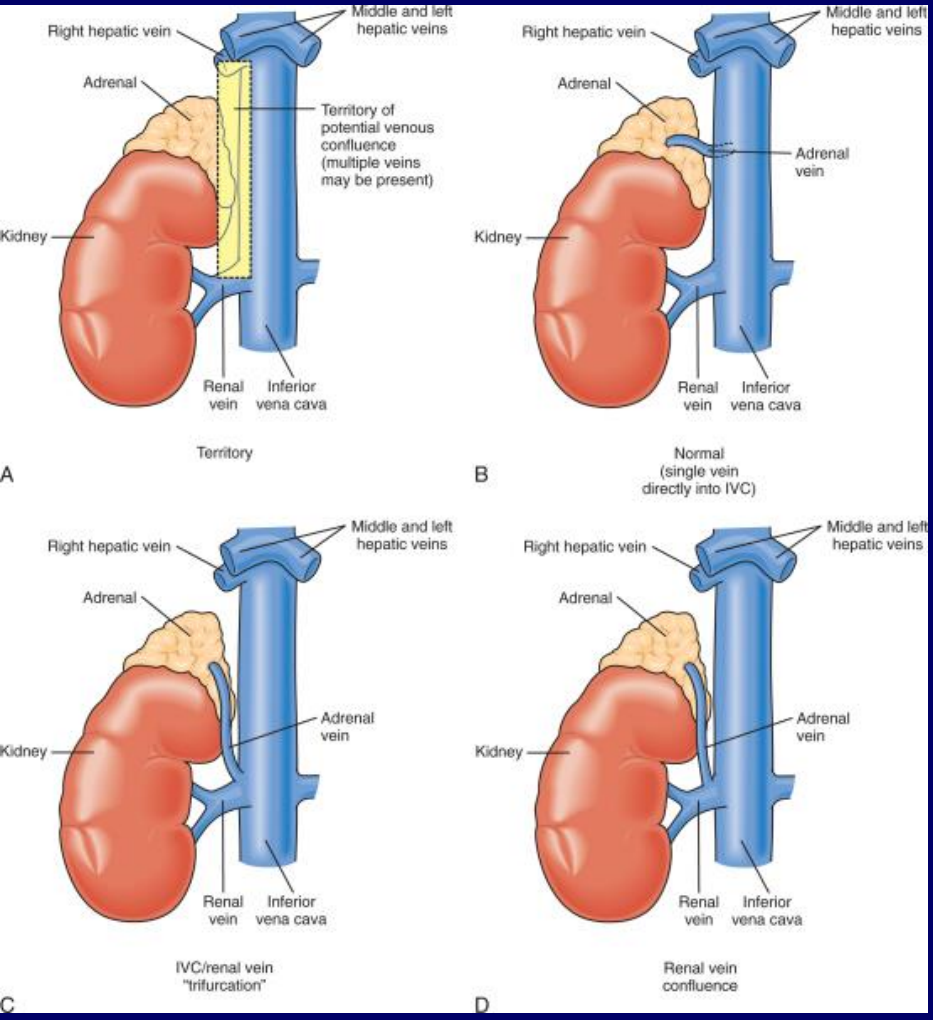
Poschong Suesat M.D.

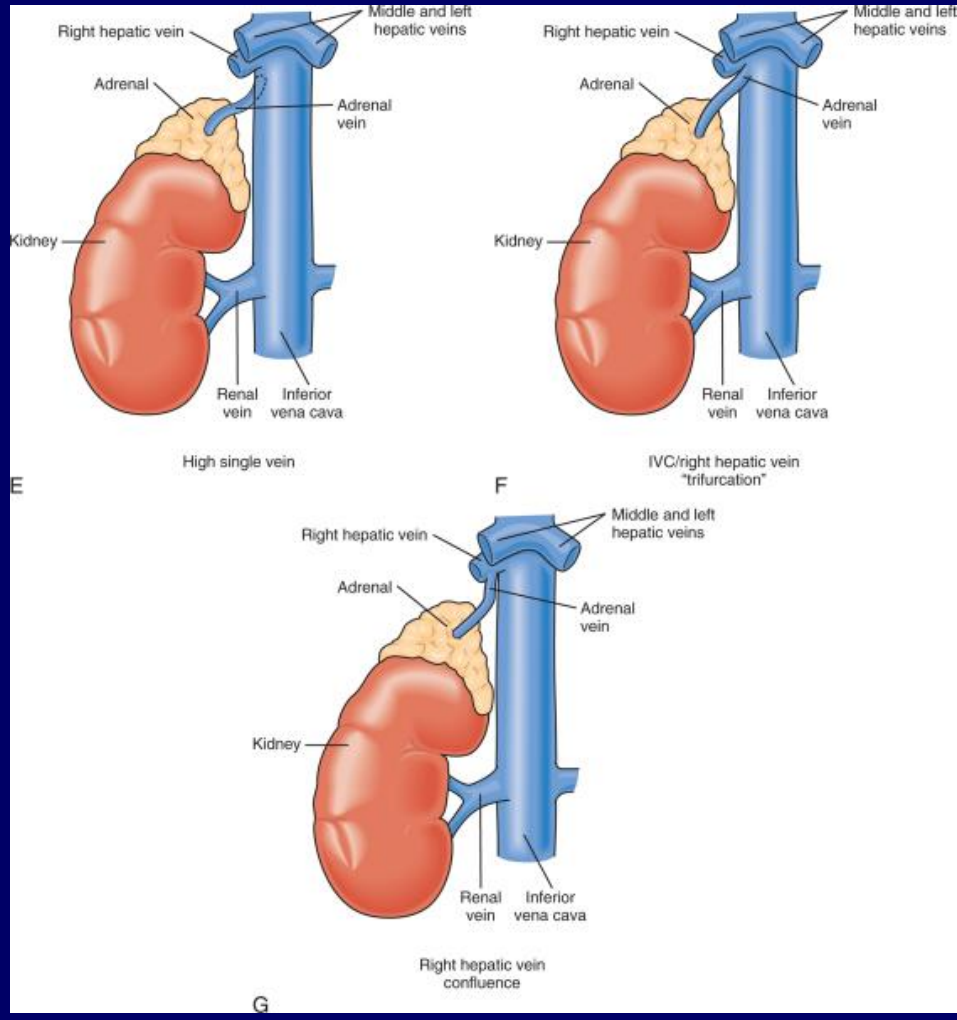
Anatomy of adrenal gland

Weight = 4-6 gm. (each)
Size = 4-5 cm. x 2-3 cm. x 0.5-1 cm. (each)
Shape = pyramidal (right) , crescent (left)
Color = golden orange, mustard
Consistency = fine granular texture , friable
Location = T11, subdiphragmatic


Stomach
Spleen
Adrenal gland
Pancreas
Kidney
Duodenum
Liver
Adrenal gland
Inferior
vena cava
Kidney
Pancreas
Stomach
Spleen
Adrenal gland
Kidney
Diaphragm
B
Liver
Inferior
vena cava
Diaphragm
Adrenal
gland
C


Right and left inferior phrenic arteries
Inferior vena cava
Left adrenal gland
Right adrenal gland
Right adrenal vein
Left inferior phrenic vein
Left inferior adrenal artery
Right renal artery and vein
Left adrenal vein
Left kidney
Left renal artery and vein
Inferior vena cava
Abdominal aorta
A


Right hepatic vein
Middle and left hepatic veins
Adrenal
Territory of potential venous confluence (multiple veins may be present)
Kidney
Renal vein
Inferior vena cava
Territory
A
Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
Normal (single vein directly into IVC)
B
Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
IVC/renal vein "trifurcation"
C
Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
Renal vein confluence
D


Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
High single vein
E
Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
IVC/right hepatic vein "trifurcation"
F
Right hepatic vein
Middle and left hepatic veins
Adrenal
Adrenal vein
Kidney
Renal vein
Inferior vena cava
Right hepatic vein confluence
G

Laparoscopic Gold standard Procedures

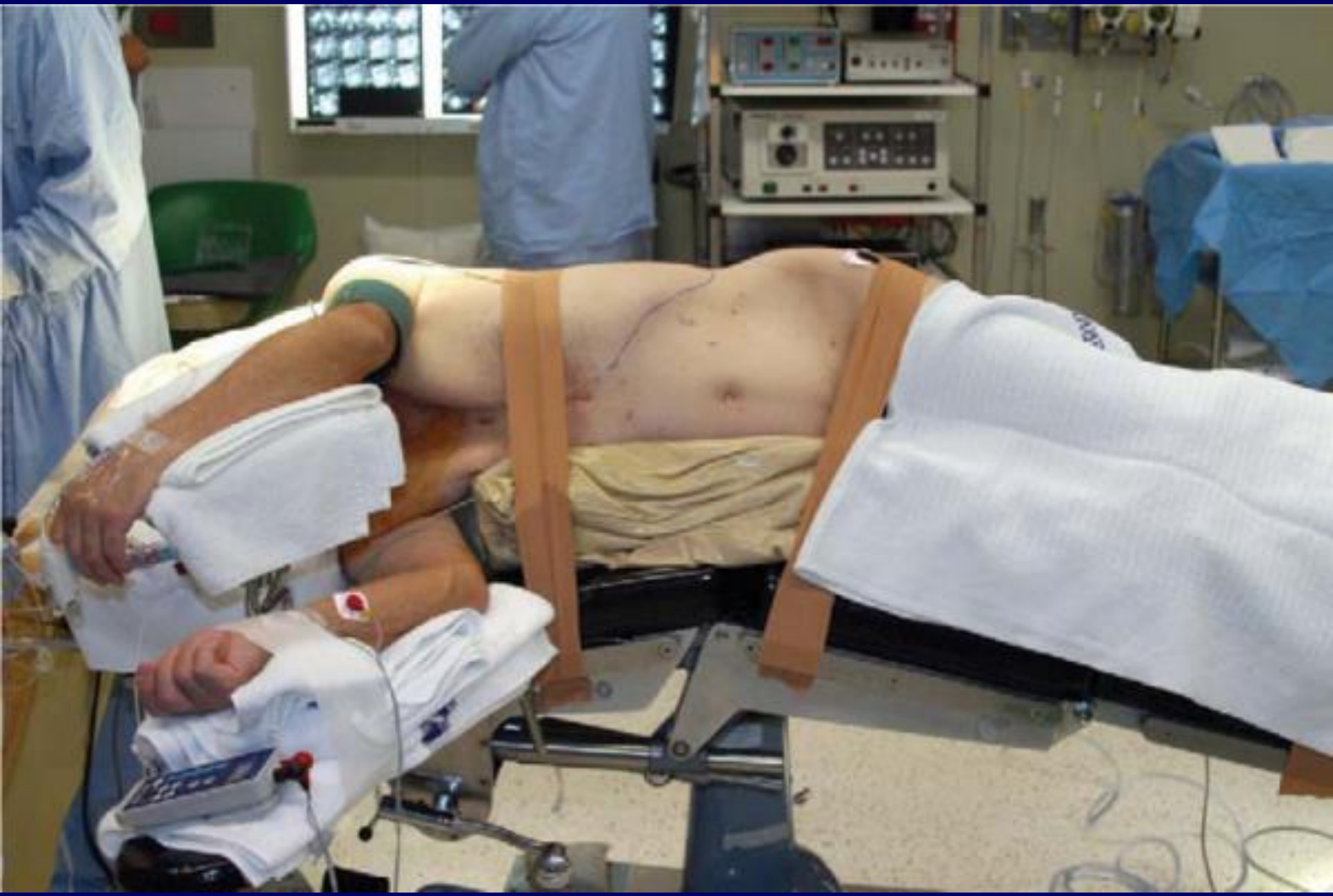
- Cholecystectomy
- Adrenalectomy

History Backgroud

1992 Joseph Petelin (France)
Michael Gagner et al (Canada)
Higashara E. et al (Japan)

Laparoscopic Approachs

1. Transperitoneal anterior approach
2. Posterior retroperitoneal approach
3. Transperitoneal lateral (flank) approach



Indications of Laparoscopic Adrenarectomy

1. Aldosteronoma

2. Cushing syndrome

2.1 Cortisol-producing adenoma

2.2 Primary adrenal hyperplasia

2.3 Failed treatment of ACTH

– Dependent Cushing's

3. Pheochromocytoma

4. Nonfunctioning cortical adenoma (incidentaloma) > 4 cm.

5. Small vinilizing adenoma

6. Adrenal metastasis

7. Miscellaneous (myelolipoma, adrenal cyst, ganglioneuroma)

My own experience in Laparoscopic Adrenalectomy

- Four left adrenalectomy

(three aldosteronoma, one Cushing)

- One right adrenalectomy

(aldosteronoma)

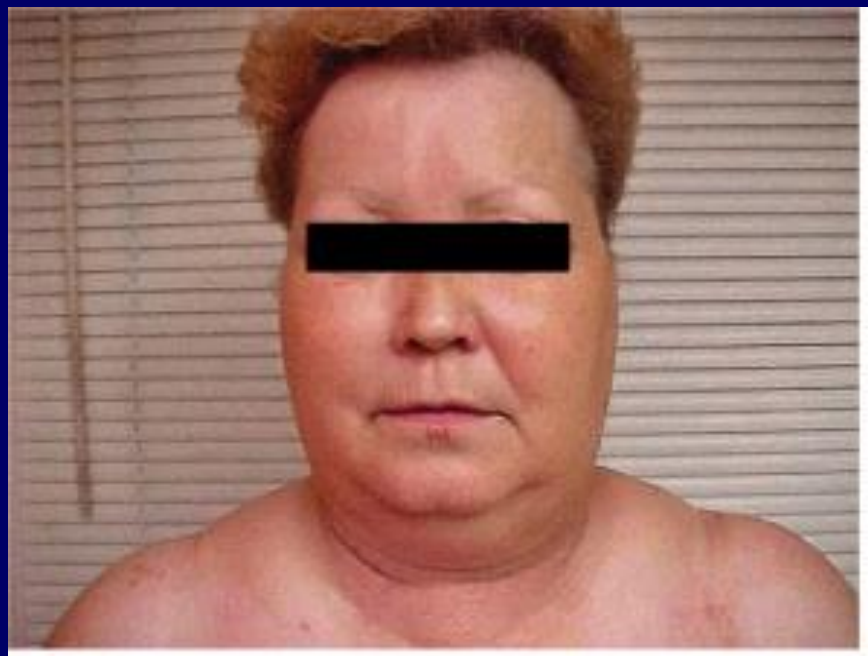
- One bilateral adrenalectomy

(Cushing)

Cushing's Syndrome

- Obesity, Peculiar fat deposition
- Amenorrhea, Impotence
- Purple striae
- Hypertension, Diabetes
- Other features that constitute the syndrome :-

  Moon facies, Hirsutism, and Acne



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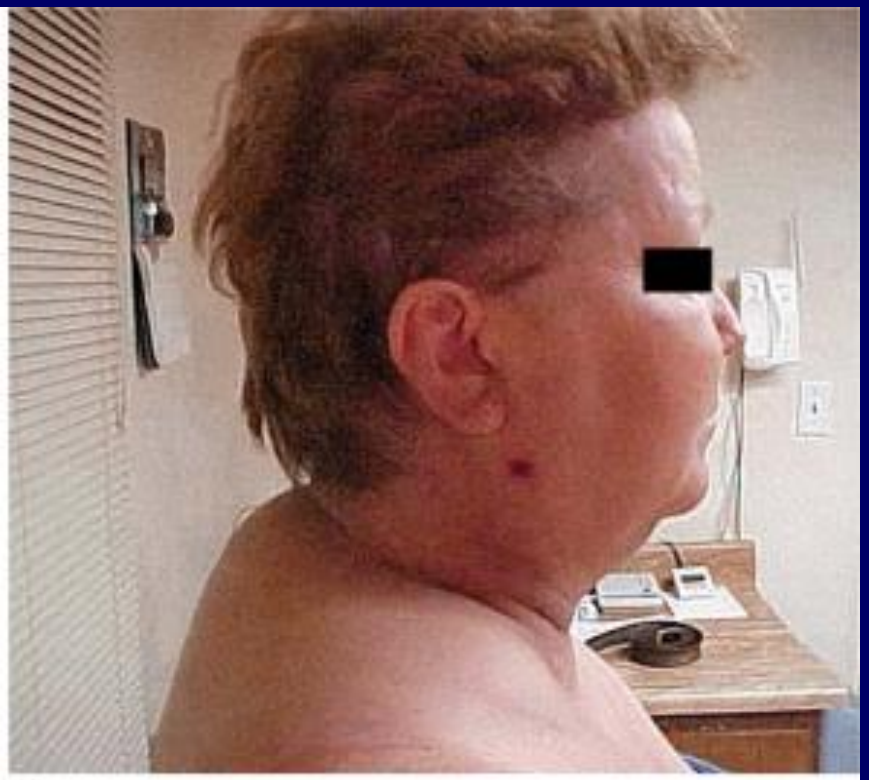
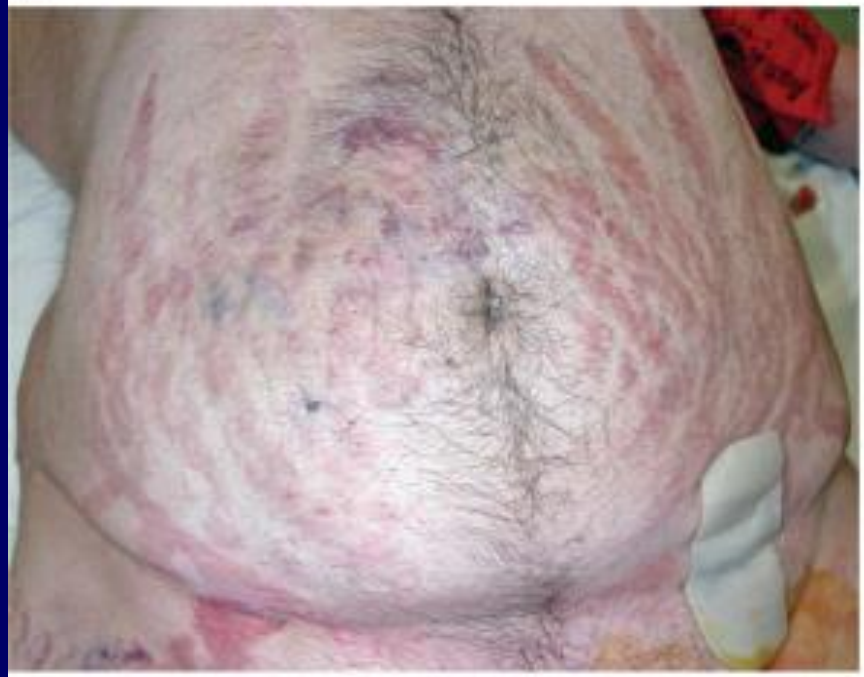


B



C

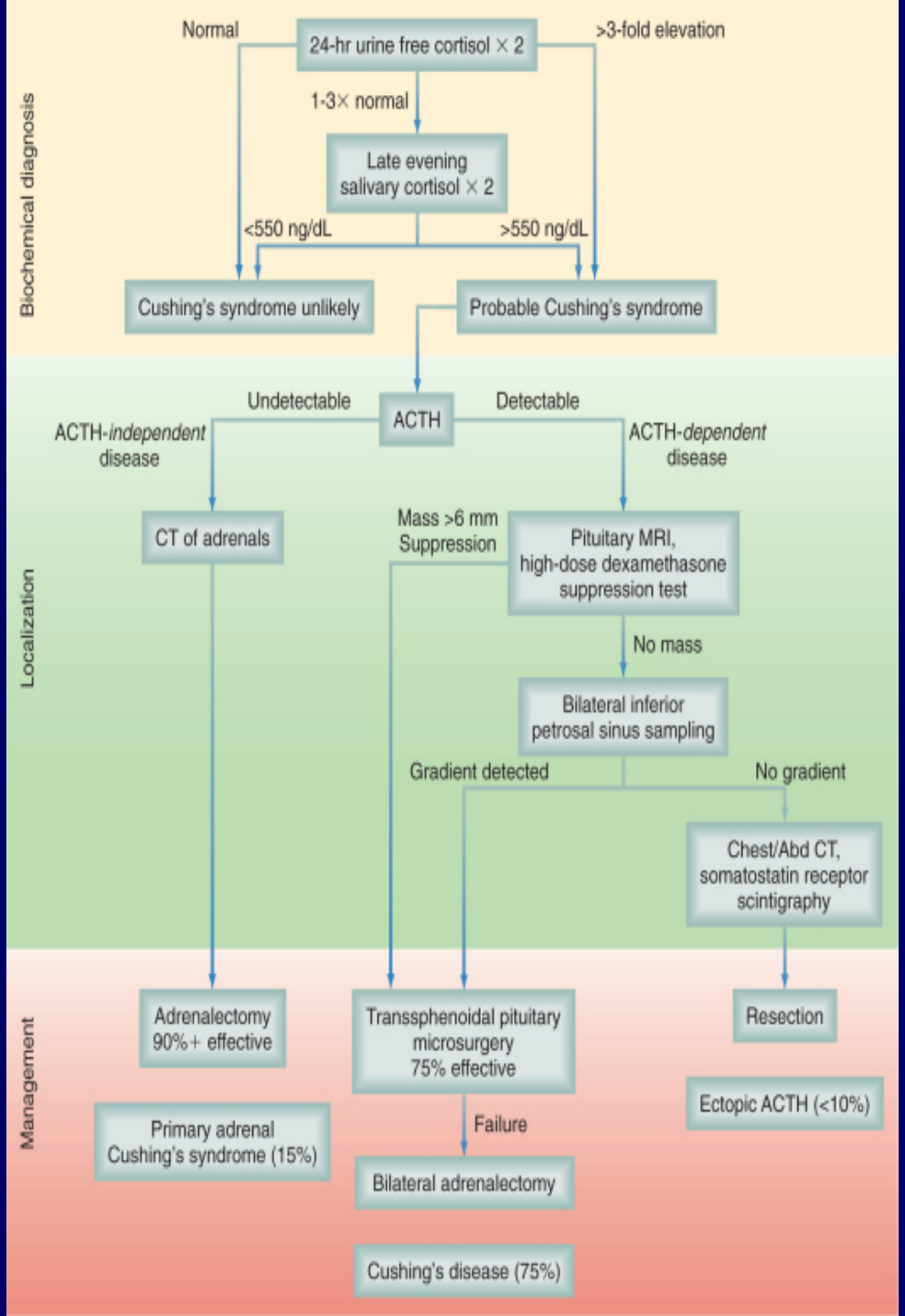
The causes of Cushing's syndrome

Exogenous (most common cause)

- Administration of steroids

Endogenous (rare, 5-10 per million)

- ACTH-hypersecreting pituitary adenoma (75%)
- Primary adrenal Cushing's syndrome (15%)
- Ectopic ACTH syndrome :- neuroendocrine tumors or bronchogenic malignancies (<10%)


Biochemical diagnosis
Normal
24-hr urine free cortisol × 2
>3-fold elevation
1-3× normal
Late evening salivary cortisol × 2
<550 ng/dL
>550 ng/dL
Cushing's syndrome unlikely
Probable Cushing's syndrome
Localization
Undetectable
ACTH
Detectable
ACTH-independent disease
ACTH-dependent disease
CT of adrenals
Mass >6 mm
Suppression
Pituitary MRI, high-dose dexamethasone suppression test
No mass
Bilateral inferior petrosal sinus sampling
Gradient detected
No gradient
Chest/Abd CT, somatostatin receptor scintigraphy
Management
Adrenalectomy 90%+ effective
Transsphenoidal pituitary microsurgery 75% effective
Resection
Primary adrenal Cushing's syndrome (15%)
Failure
Ectopic ACTH (<10%)
Bilateral adrenalectomy
Cushing's disease (75%)

The surgical treatment

Adrenalectomy is more than 90% effective in the treatment of primary adrenal Cushing's syndrome

Bilateral adrenalectomy is indicated in

- **Patients with macroadenoma or hypophysial hyperplasia in which medical treatment and transsphenoid surgery have failed**
- **Bilateral benign tumors, metastatic neoplasia**
- **Ectopic ACTH syndrome due to occult or disseminated tumors, tumor cannot be localized**

A CASE REPORT

A 29 year-old male who has two years histories of Cushing's disease and transsphenoidal pituitary tumor resection was admitted to the hospital because of recurrent Cushing's syndrome for two weeks.

Symptoms and Signs

Truncal obesity, Purple striae, Moon facies

Extreme muscle weakness, Hypertension

Laboratory tests

Severe hypokalemia

Cortisol level 53.50 microgm./dl (normal 6-17)

ACTH 37.9 pg/ml (normal 0-21)

Low-dose dexa. Suppresion test - negative

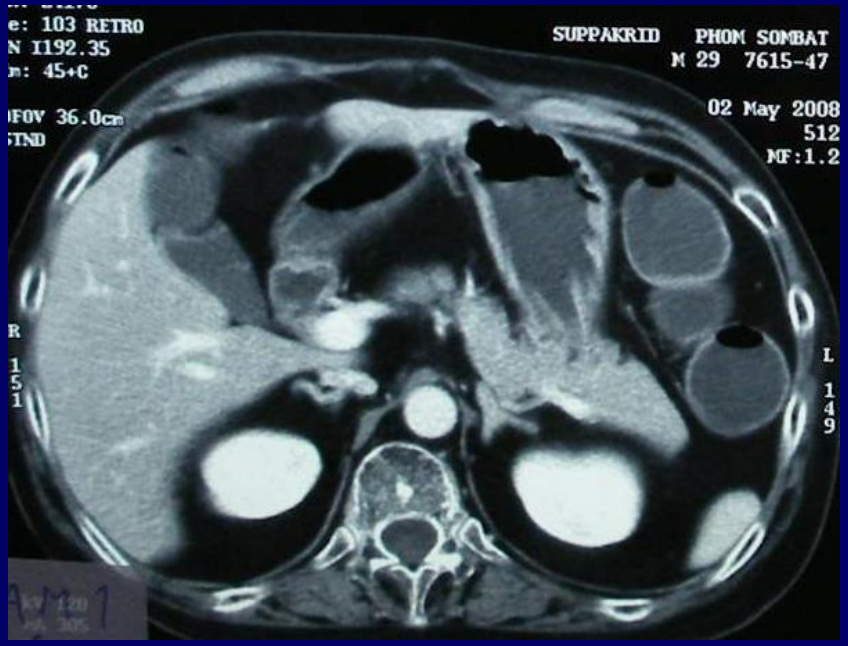
High-dose dexa. Suppresion test - negative

MRI brain - small pittuitary gland, no mass

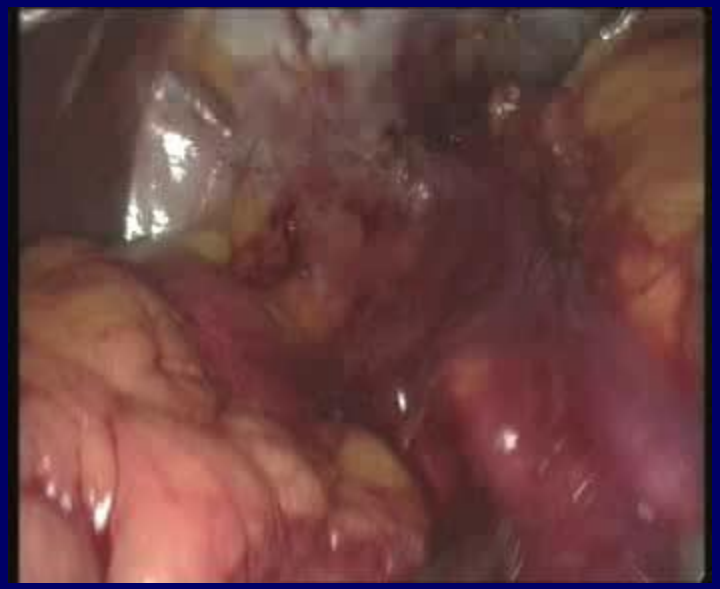
CT chest & abdomen - negative for neoplasms

CT abdomen - bilat. adrenal hyperplasia

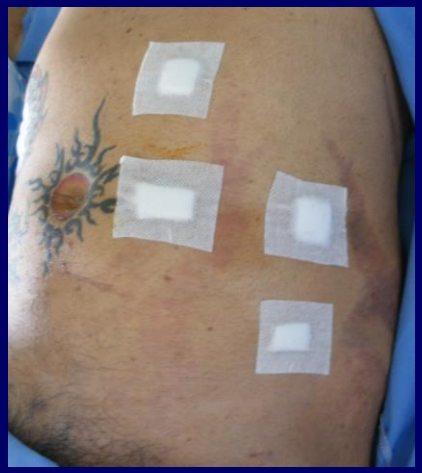
LAPAROSCOPIC BILATERL ADRENALECTOMY

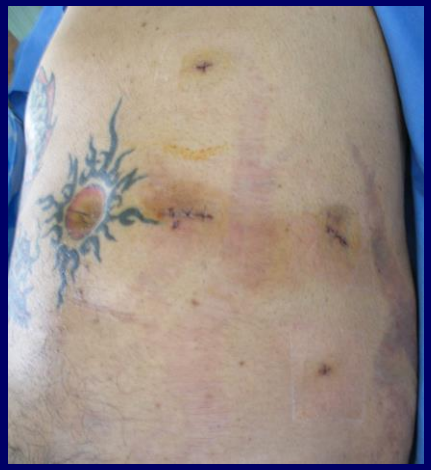


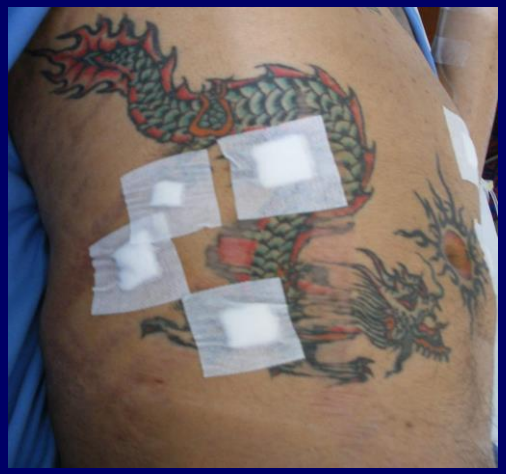
LAPAROSCOPIC BILATERL ADRENALECTOMY

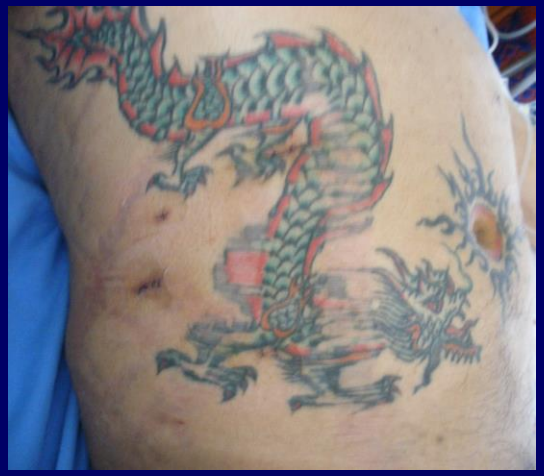


LAPAROSCOPIC BILATERL ADRENALECTOMY









Results

Operative time was 305 minutes, including repositioning. There were no intraoperative and postoperative complications. The patient resumed a regular diet on the first postoperative day. Inpatient postoperative hospital length of stay was 7 days, mainly for steroid-replacement and medical management.

CONCLUSIONS

Laparoscopic bilateral adrenalectomy for Cushing's disease refractory to medical management can be performed with low morbidity. Symptoms and signs of hypercortisolism rapidly improve postoperatively.

Thank You

for attention