A gut feeling: abdominal mass in a 57 year old

Matt Ettleson, M.D.*

Endorama

February 6, 2020

M170

AT THE FOREFRONT
UChicago Medicine

Learning Objectives

- Building a differential diagnosis of adrenal masses
- Review evaluation of adrenal masses
- Understanding the prognosis (in this case)
- Treatment options and follow up

A 57 year old Caucasian man with a history of HTN, GERD, and a-fib presents with abdominal pain.

Initial evaluation

October 2018

For six months prior to presentation, he has experiencing abdominal cramping and bloating and felt that his abdomen was enlarging.

More recently, his abdomen has felt ‘firm.’

Despite an enlarging abdomen, he has lost 12 lbs in the last 2 – 3 months.

He has pain after eating that he rates as a 3/10.

He is constipated and has early satiety. Some night sweats. No fevers.

He had a grandfather who died of stomach cancer. No other family history.

Initial evaluation

October 2018

Vitals

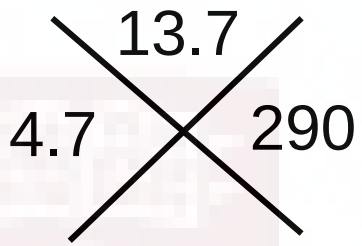
Temp: 36.7
Pulse: 86
BP: 127/75
Weight: 96.1 kg
Height: 177.8 cm

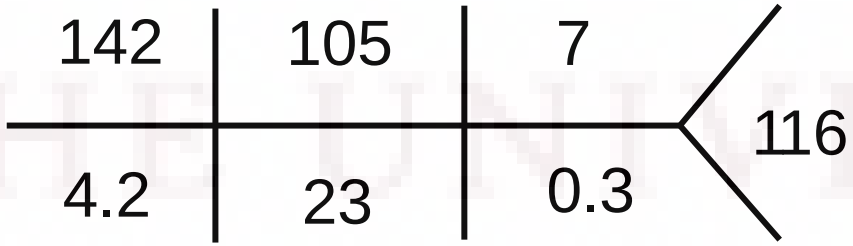
Physical Exam

General: he appears well, not cachectic
HEENT/Neck: EOMI. Neck supple. No palpated cervical lymphadenopathy.
Cardiac: RRR, normal S1/S2. No murmur.
Pulmonary: clear to auscultation bilaterally.
Abdomen: **His abdomen is distended with tenderness. There is significant firmness in the right upper quadrant which crosses the midline and is dull to percussion.**
Skin: Warm and dry
MSK: 1+ pitting edema in his lower extremities bilaterally
Neuro: DTRs 2+ throughout. Alert and oriented.
Mood: Normal mood and affect. Normal behavior.

Initial evaluation

October 2018





calcium 9.1

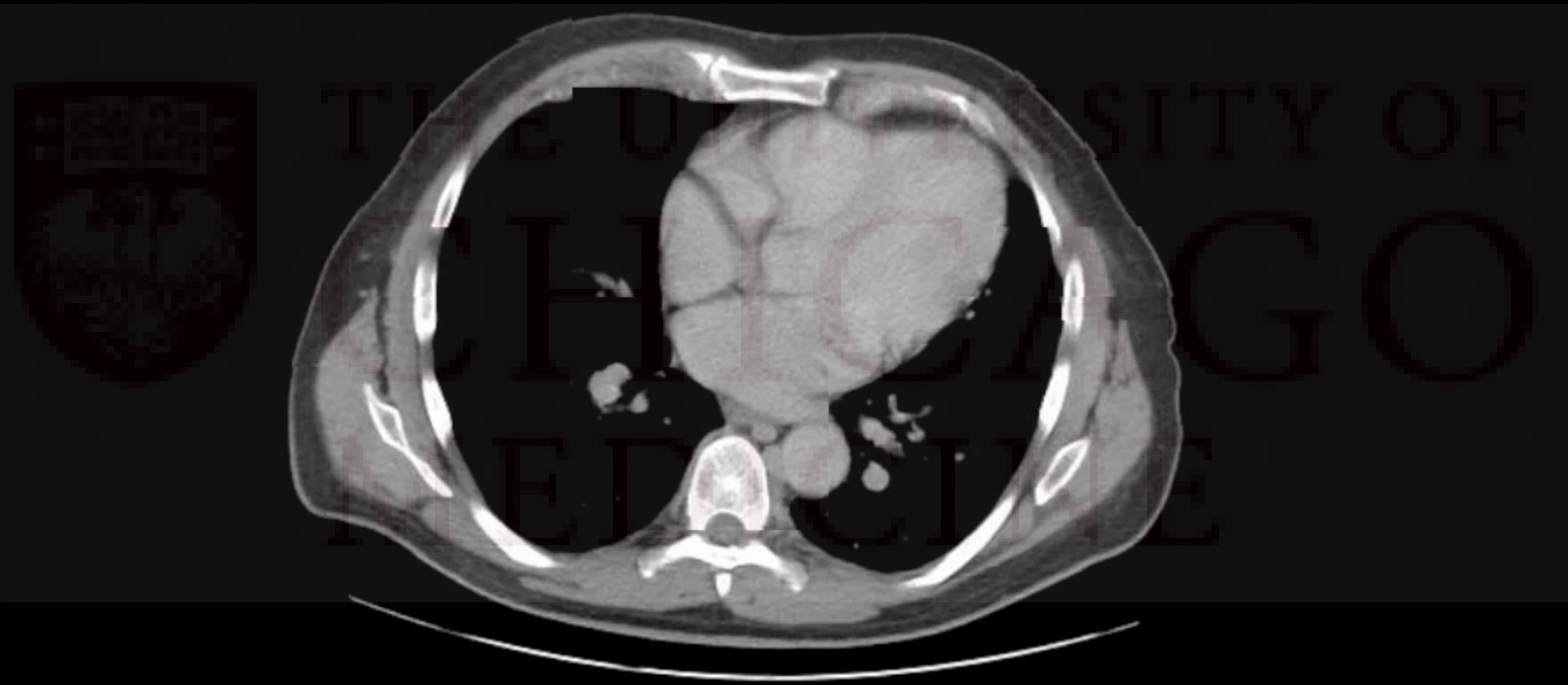
total protein 7.4
albumin 3.3
total bilirubin 0.3
alk phos 77
AST 36
ALT 25

INR 1.1
Lipase 25

Next step: abdominal CT scan

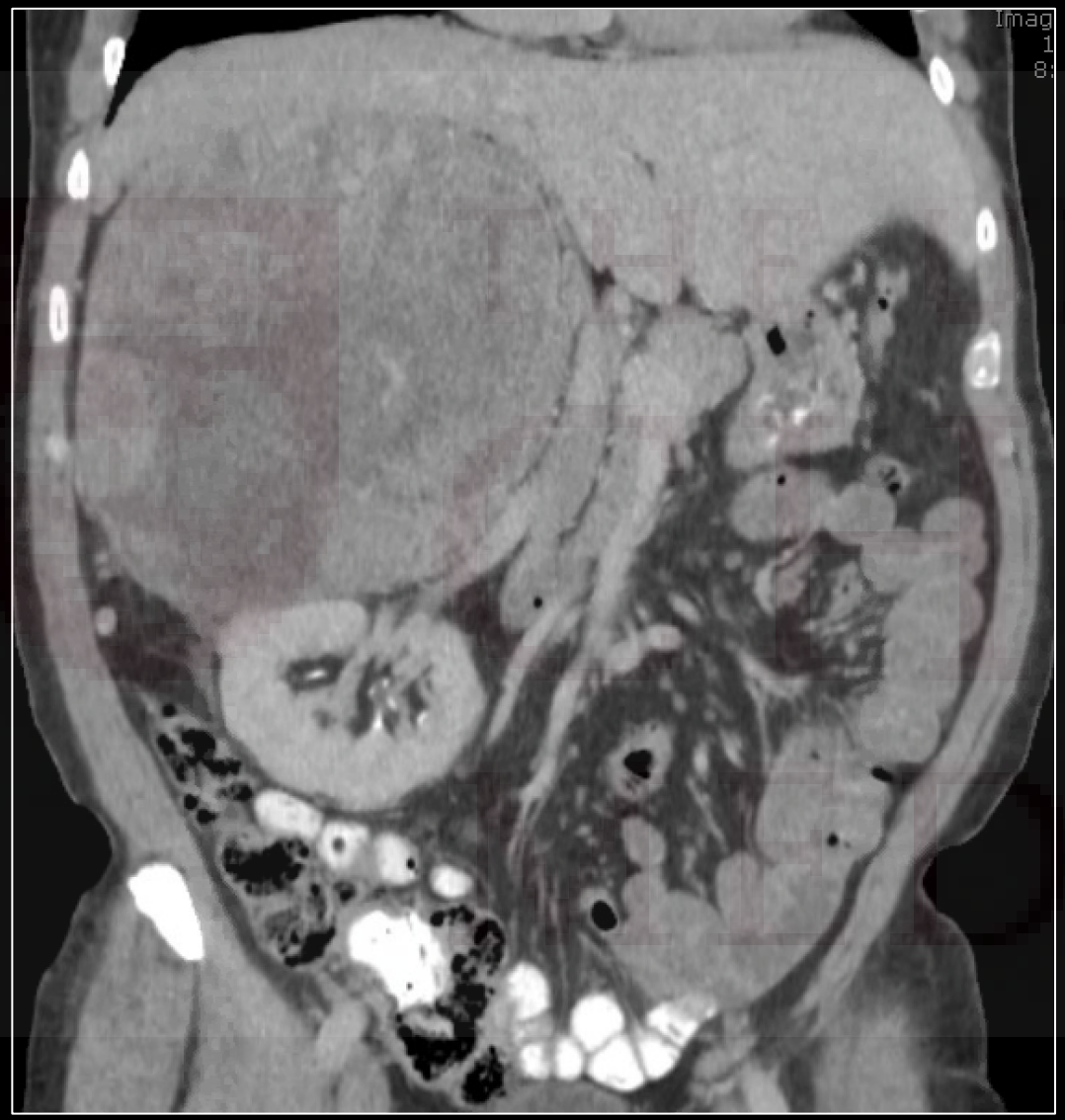
CT scan w/wo contrast

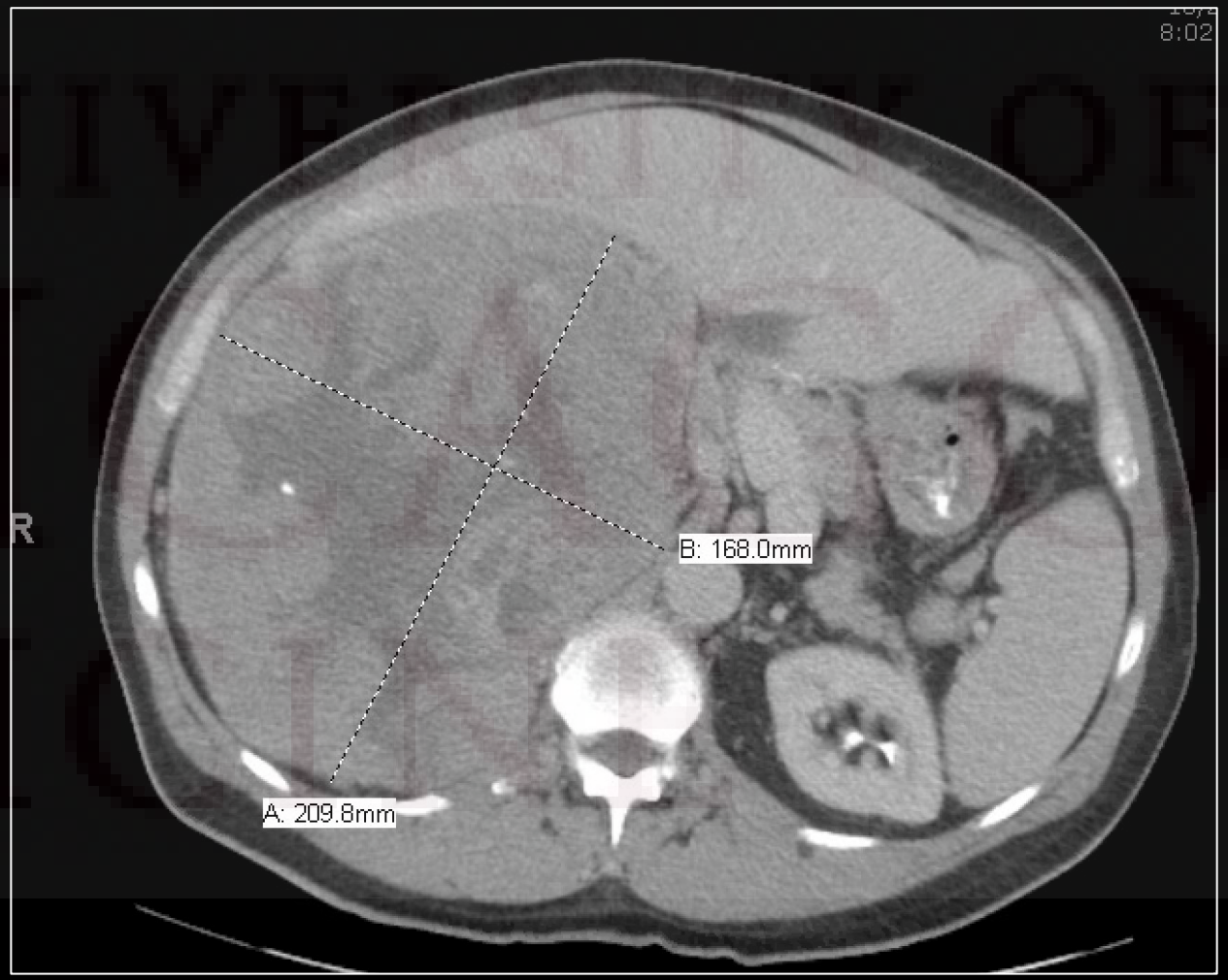
October 2018



CT scan w/wo contrast

October 2018





CT scan w/wo contrast

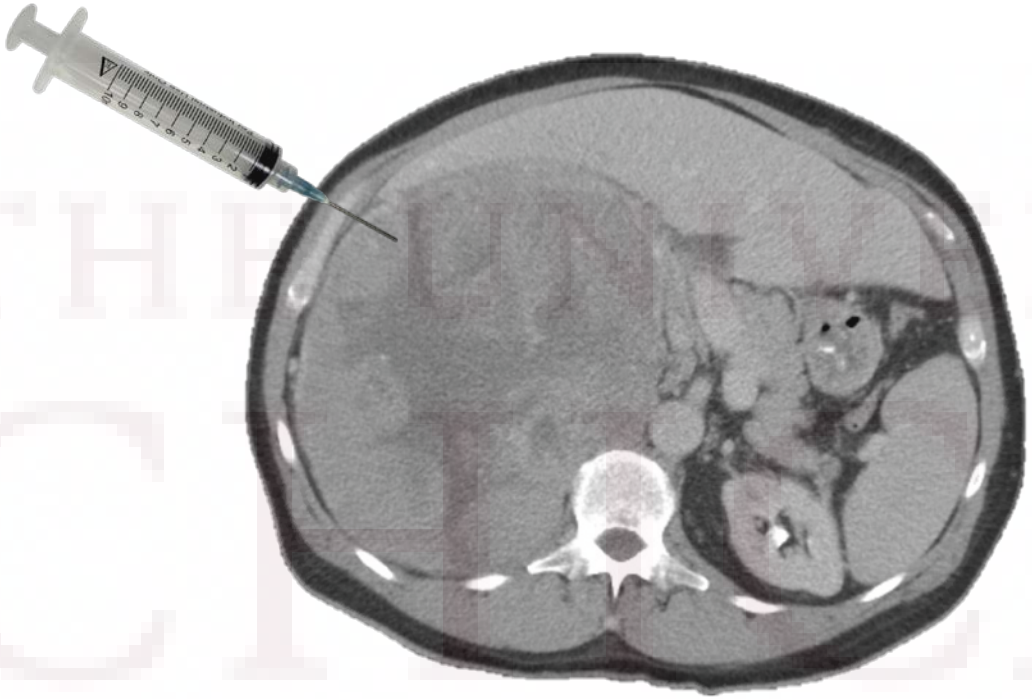
October 2018

Impression:

16 cm mass epicenter right upper quadrant of the abdomen. Primary consideration would be for an exophytic hepatic lesion or adrenal lesion. Findings compatible with a neoplastic process. Tissue diagnosis is recommended.

core needle biopsy

October 2018

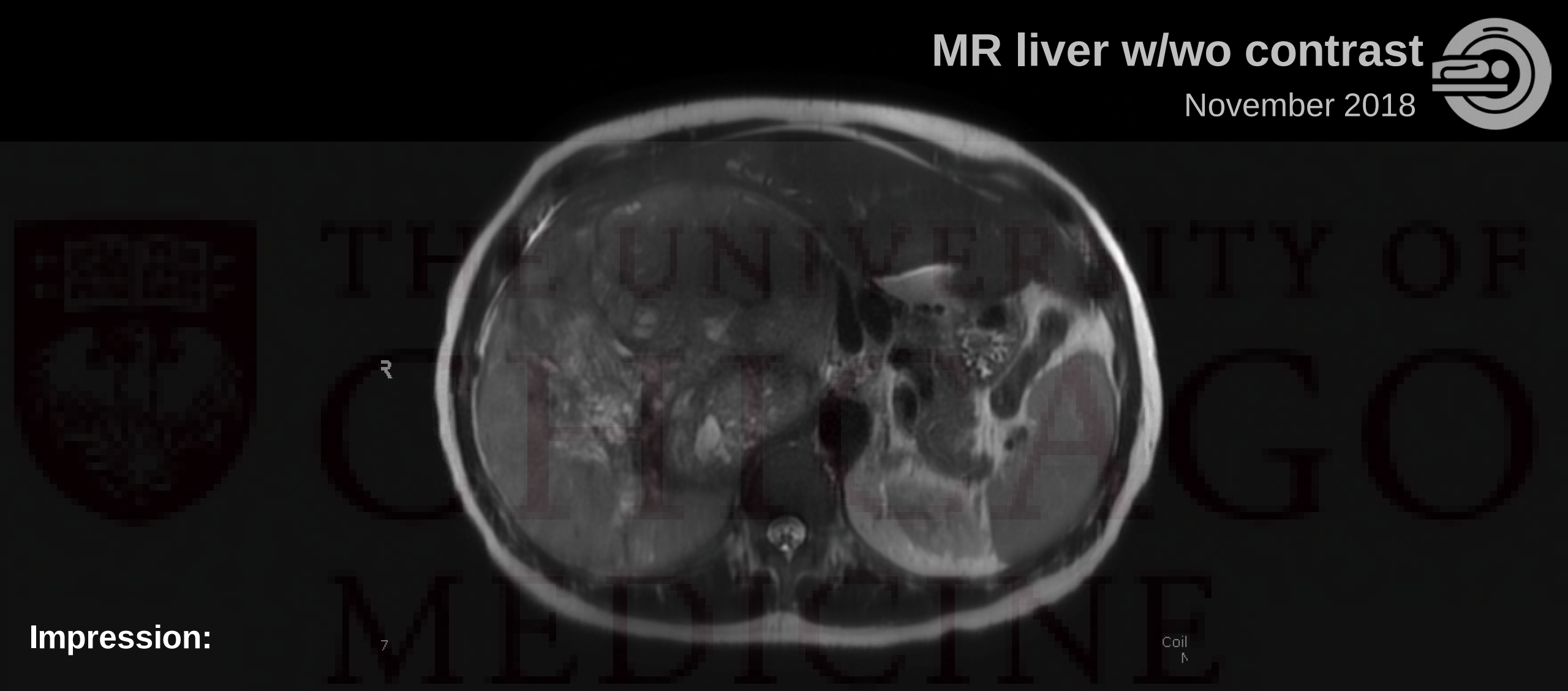


Impression:

The available tissue is entirely compromised of necrotic tissue debris. In the context of the presentation some of this tissue could certainly represent necrotic tumor. But the available material does not allow a firm diagnosis.

MR liver w/wo contrast

November 2018



Impression:

Large abdominal/retroperitoneal mass. This is favored to be from the right adrenal, which is not seen, or retroperitoneal origin. Mass emanating from the liver or right kidney cannot be excluded. Invasion into the liver and kidney cannot be ruled out. No evidence of lymphadenopathy or areas of metastatic spread.

Assuming this mass is of adrenal origin/located in the adrenal gland, what is on your differential?

A CT guided biopsy was indeterminant. Do you agree with the decision to pursue biopsy at this stage of evaluation?

THE EVALUATION OF INCIDENTALLY DISC

Anand Vaidya, MD, *MMSc'; Amir Hamrahia*
Maria Fleseriu, MD'; Hans K. (
on behalf of the AAC E Pituitary, Gonad, Adrenal, and N

ABSTRACT

Objective: The objective of this Disease State Clinical Review is to provide clinicians with a practical approach to the evaluation of incidentally discovered adrenal masses.

Methods: A case-based clinical approach to the evaluation of adrenal masses is presented. Recommendations were developed using available prospective and randomized studies, cohort studies, cross-sectional studies, anecdotal observations, and expert opinions.

Results: Incidentally discovered adrenal masses are common. The approach to the patient with an adrenal mass should involve assessment of malignant potential via imaging characteristics and adrenal hormone excess via clinical and biochemical features. The roles of biopsy. surgical or medical therapy. and longitudinal surveillance are also important to consider and are influenced by case-specific factors. Inappropriate or inadequate evaluations may put patients at increased risk for developing preventable adverse cardiometabolic outcomes or cancer.

Submitted for publication November 19, 2018
Aa:cepted for publication January 6, 2019
From the 'Center for Adrenal Disorden, Division of Endocrinology, Diabetes, and Hypertension. Brigham and Women's Hospital, Harvard Medical School, Boston. MassadlUsetts, lOivision of Endocrinology, Johm Hopkins Hospital, Baltimore, Maryland, 30ivision of Endocrinology, Mayo Oinic, Rochester, Minnesota. 4Division of Endocrinology, Diabetes, and Nutrition. Department of Medicine, Oregon Health &: Sciences Univen ity, Portland, Oregon. and l Division of Endocrinology, Univen ity of Aorida and the Malcolm Randall VAMC, Gaine"!lville, Florida.
Address correspondence to Dr. Anand Vaidya. Center for Adrenal DisordeB, Division of Endocrinology, Diabetes, and Hypertension, 221 Longwood Avenue, Boston, MA 02115.
E mail:anandvaidya@bwh.harvard.edu.
Published as a Rapid Electronic Article in Press at http:// www.endocrine practice.org. 001: 10.4158/ DSCR 201s.o565
To purchase reprints of this article, please visit: www.aace.tom/ reprints.

Co•
require
tation o
static he
to consi
longitud
ations a
(Endocr

Abbre
ACTH
syndro
dehydr
units;
urinary

INTRO

The
masses (
nal nod
use of c
raphy (
Adrenal
emergen
tory or t
chest. In
during t
cancer c
tal ll.
thickeni
review
ered adr
The
rather, e
tions. T

Table 1
The Differential Diagnosis of an Incidentally Discovered Adrenal Mass

	Nonfunctional	Functional
BENIGN		
MALIGNANT		

aRare instances of functional myelolipomas and ganglioneuromas and benign androgen-secreting adenomas have been described.

Was a biopsy of the mass appropriate at this stage?

Yes. A

No. B

Undecided. C

Understanding the role of adrenal biopsy

The role for adrenal biopsy is limited.

1. If there is suspicion for an invasive infection and no other way to confirm the diagnosis. Classically, these patients are immunocompromised and/or have risk factors for mycobacterial or fungal infections.

2. There is a suspicion that non-adrenal cancer has metastasized to the adrenal. This patient may already have other identified lesions suspicious for cancer but not amenable to biopsy. Can present as bilateral adrenal masses.

Biopsy should NOT be performed to distinguish between an adrenal adenoma and carcinoma due to risk of sampling bias and seeding the needle track.

Do NOT biopsy a pheochromocytoma.

Endocr Pract. Feb;25(2):178-192.

What are the recommended biochemical tests to evaluate for adrenal hormone excess?

Table 3
Recommended Biochemical Tests to Evaluate for Adrenal Hormone Excess in a Patient With an Incidentally Discovered Adrenal Mass

Condition	Patients to Test	Test	Abnormal Value
Autonomous cortisol secretion	All		
Primary aldosteronism	Hypertension and/or hypokalemia		
Pheochromocytoma	Lipid-poor, contrast-avid, heterogeneous adrenal masses		
Adrenal androgen excess	Hirsutism or virilization		

Abbreviation: DHEAS = dehydroepiandrosterone sulfate.

Endocr Pract. Feb;25(2):178-192.

What further evaluation was* actually *done in this case to determine diagnosis and management of the adrenal mass?

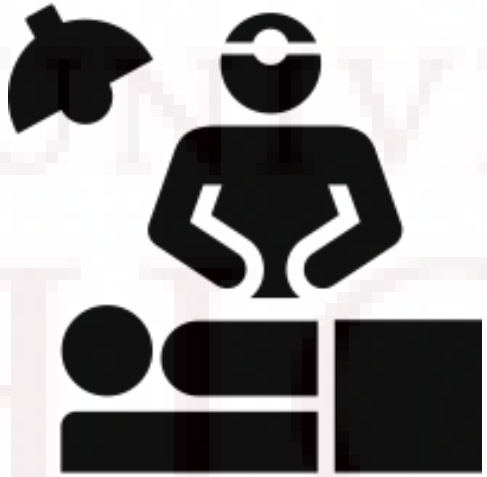
Plasma metanephrines: < 0.20
Plasma normetanephrines: 0.55

CEA 0.3
AFP 1

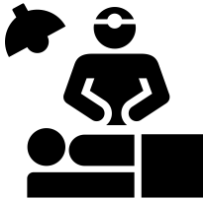
EGD with EUS/biopsy:

Mild Schatzki ring, biopsied.
Extrinsic compression of the distal stomach and proximal duodenum from RUQ mass.
16cm RUQ mass, well defined/rounded in appearance, heterogenous. The mass did not appear to invade adjacent structures. Biopsied.

Pathology: Immunostains performed on the mass reveal tumor cells positive for synaptophysin, Melan A and inhibin. There is intact nuclear expression of INI-1 and BRG-1 in the tumor cells. These findings are consistent with adrenal cortical carcinoma.



Based on these findings, radical resection of the mass, right adrenal and (possibly) kidney is recommended.



Operation performed:

1. diagnostic laparoscopy
2. exploratory laparotomy
3. radical right adrenalectomy including right nephrectomy, perinephric lymphadenectomy, hepatic wedge resection, and small resection of right hemidiaphragm
4. Right hemidiaphragm repair
5. Placement of right chest thoracostomy tube

He was instructed to take 32mg of methylprednisolone 12 hours and 2 hours prior to surgery.

EBL: 4.5 L, patient received 4 units pRBCs, 5L crystalloid and albumin

Surgica atho ogy Re_ort

FI A: A:HO OGIC DIAG_OSIS

A. Xi_h *id* recess; excision:
- B and bone rr.arrotrl, no turr.or resent.
ne

B. Renal hilar lymph node; excision:
- One yrr_h node, n turn r resent (/1)

C. Retro_eritoneal yrr. h nodes; exc sion:
- :hree lyrr._h nodes, no turr.or resent /3)

D. Additional retro eritonea tissue; excision:
- One yrr node and fibroadi_ose tissue, no t or resent (/1}

E. Right adrena g and and kidney, radica adrena ect my and ne_hrectorey:
- Adrenal c rt·cal carc·n rr.a, nc cyt c type (28.1 x 25.2 x 13.9 em, 37
gra.ms ,
with extensive necrosis and vascu ar invasi n.
argins of resection, no turror resent.
Adrenal c rtical carcin rra in vascular s ace ¥/i idney _arenchyroa.
- Renal _arenchyrar.a lith rr ld arterione thin hrosclerosis.
- See atho gic _ararr.eters and c rrn.ent.

AD E.A:. G D

r cedure: Adrenalec y, tota

s_e *i en* aterality: *ig* t

r Size: .1 x S. x 1 .9

r lei_ht: 7 rarr..s

Hist *gi* e: Adrena rtical ar in rr a, n y *i* type

Hist *gi* rade: H-gh grade > mitoses/5 h-g 1er fields)

Lymphovas ar Invasi n: S a 1 vesse (a_"1 ary yrt_ ati

r Extensi n: ?urr.or nvades int eri adrenal s ft .iss e

arg ns: ninv ve by r 1 rrr. fr rese ti n rrar n

egi na l.Tytr._ des: .egative f r rra /5

a h *gi* S lassif-a…i n _. th Edit-n . _ , _

age

n: ent

art E: rr.n:un *is* .. c err.ical sta ns f r evaluati n f cr satel ite ·ns *abi* ·…y

are rdered and res .9 /.1 e re_ r ed in an addend .. Dr enri sen rev·*1ed*

n n-ne las *i* idney and .·S st a-n and n urs.

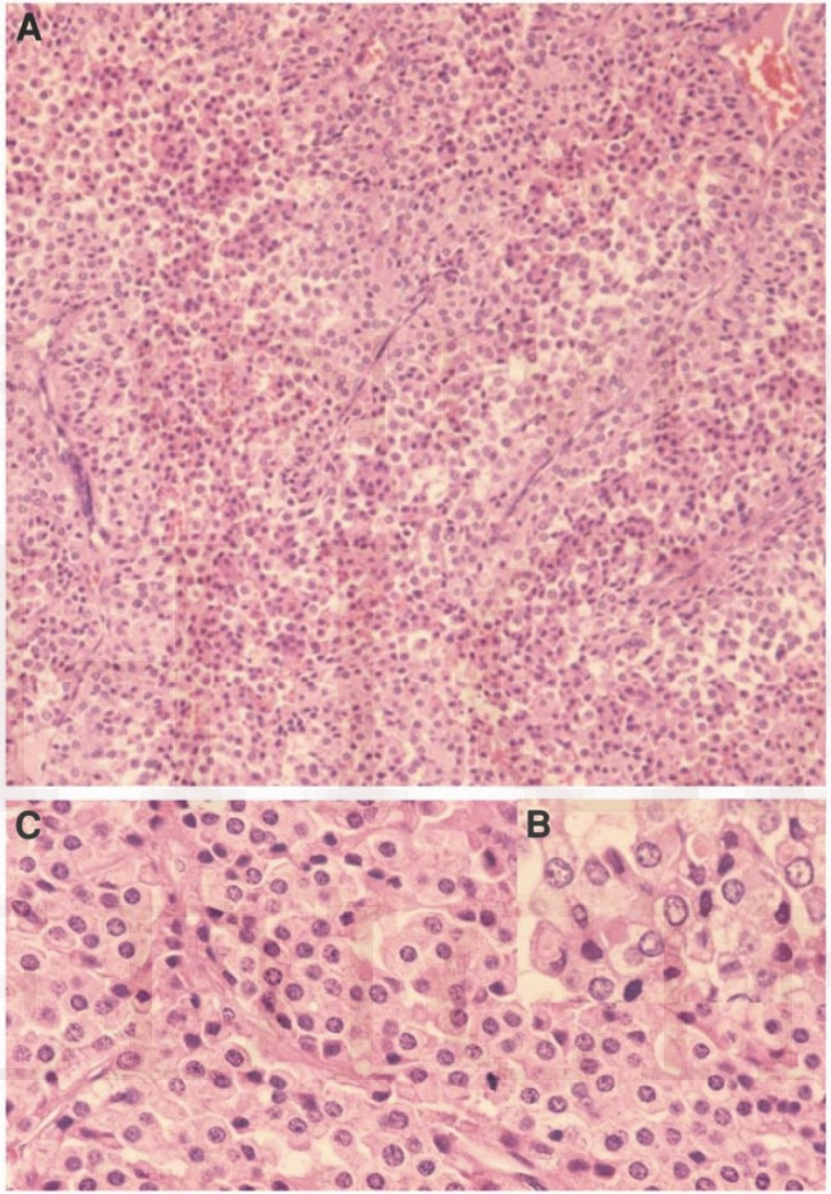


Fig. 5. Histopathologically defined small adrenocortical carcinoma producing aldosterone. The tumor consists of compact cells, proliferates in a diffuse growth pattern, and necrotic and necrobiotic areas remote from blood vessels, reminis cent of a so-called perithelial pattern **(A).** Several tumor cells contain spirono lactone bodies in their cytoplasm **(B).** Occasional mitotic figures are found in the tumor **(C).**

Endocr Pathol. 2005 Spring; 16(1):13-22.

Adrenocortical Carcinoma in the United States

Treatment Utilization and Prognostic Factors

Karl Y. Bilimoria, MD, MS[1,2]
Wen T. Shen, MD[3]
Dina Elaraj, MD[1]
David J. Bentrem, MD[1]
David J. Winchester, MD[1,4]
Electron Kebebew, MD[3]
Cord Sturgeon, MD, MS[1]

[1] Department of Surgery, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

[2] Cancer Programs, American College of Surgeons, Chicago, Illinois.

BACKGROUND. Adrenocortical carcinoma (ACC) is a rare tumor with a relatively poor prognosis. The authors' objectives were to examine treatment utilization and factors associated with long-term survival after resection of ACC in a large,

found on presentation in 21.0% of patients. A total of 57.4% of patients underwent surgical resection alone, whereas 16.0% underwent resection with adjuvant chemotherapy or radiation. A total of 19.4% had margin-positive resections. Treatment utilization remained unchanged from 1985 to 2005 (P = .28). Median follow-up was 24 months. Overall 5-year survival for all patients who underwent resection was 38.0% (median survival, 31.9 months). Multivariable analysis demonstrated a higher risk of death with increasing age, poorly differentiated tumors, involved margins, and nodal or distant metastases. Overall survival remained unchanged from 1985 to 2000 (P = .08).

CONCLUSIONS. ACC carries a poor prognosis for patients commonly presenting with large, locally invasive tumors, involved margins, and metastatic disease. Survival is not affected by size but is diminished with increasing age, poorly differentiated tumors, involved margins, and the presence of regional and distant disease. Identification of novel therapies may help to increase survival, which has remained unchanged over the last 20 years. Cancer 2008;113:3130–6. © 2008 American Cancer Society.

KEYWORDS: adrenocortical carcinoma, surgery, chemotherapy, treatment, prognostic factors, National Cancer Data Base.

Karl Bilimoria is supported by the American College of Surgeons Clinical Scholars in Residence program.

David Bentrem is supported by the American Cancer Society (ACS IRG 93-037-12).

The National Cancer Data Base is supported by the American College of Surgeons, Commission on Cancer, and the American Cancer Society.

Address for reprints: Karl Y. Bilimoria, MD, MS, American College of Surgeons, Cancer Programs, 633 N. St. Clair Street, 22nd Floor, Chicago, IL 60611; Fax: (312) 202-5011; E-mail: k-bilimoria@northwestern.edu

Received April 29, 2008; revision received June 23, 2008; accepted June 29, 2008.

Adrenocortical carcinoma (ACC) is a rare tumor with an estimated worldwide annual incidence of 2 per million.[1-3] It is responsible for only approximately 0.2% of all cancer deaths in the United States annually, and it is the second most aggressive endocrine malignancy behind anaplastic thyroid cancer.[3] Women are more frequently affected than men (1.5:1), and patients present with evidence of adrenocortical hormonal excess in 40% to 60% of cases.[1,3,5-7] The prognosis of ACC is generally dismal because most patients present with large tumors and advanced disease. Approximately 50% to 70% of patients have extra-adrenal disease at the time of presentation.[1-6]

Treatment strategies have included resection with or without adjuvant chemotherapy and/or radiation. Complete resection is

Published online 30 October 2008 in Wiley InterScience (www.interscience.wiley.com).

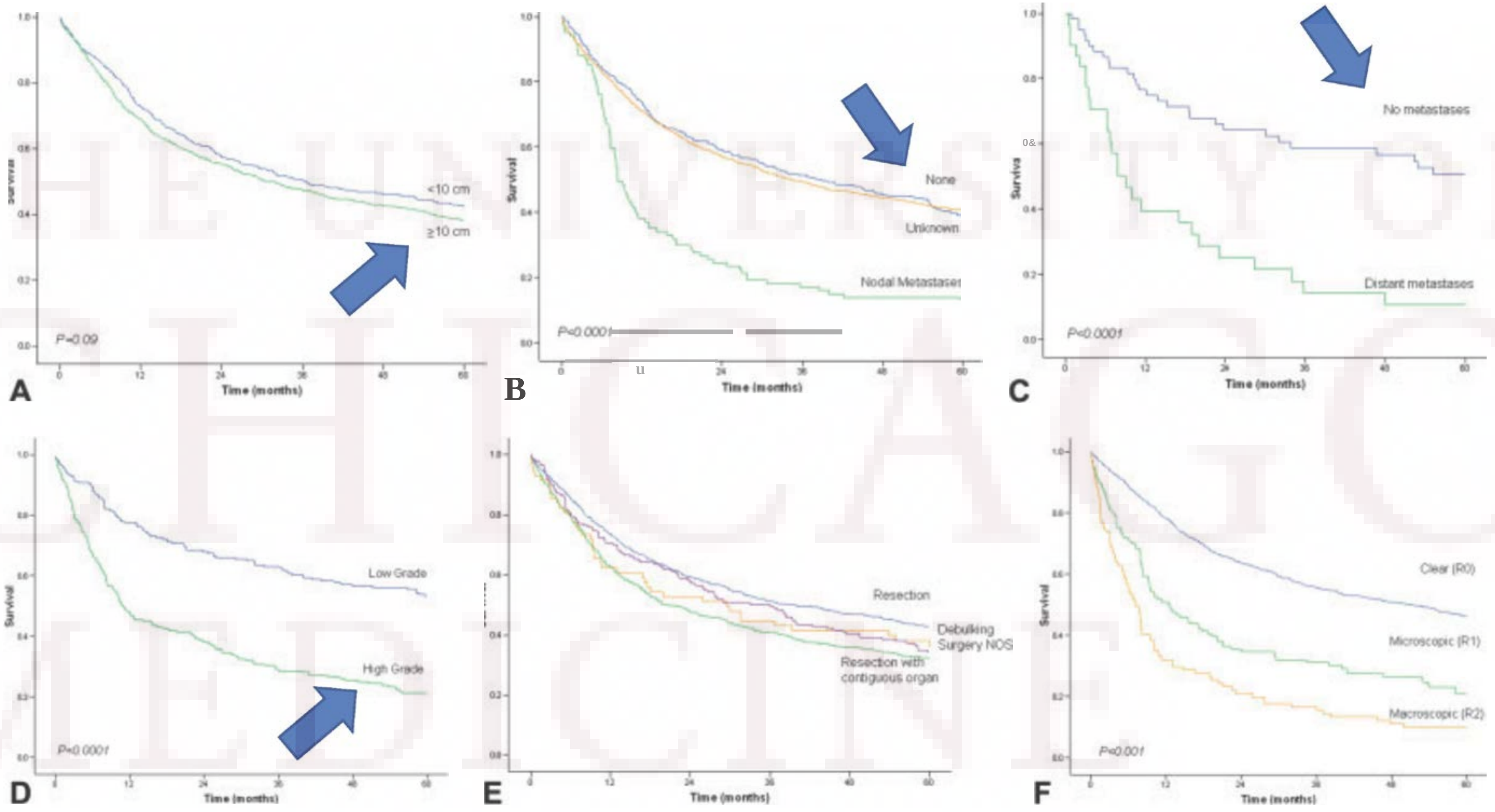
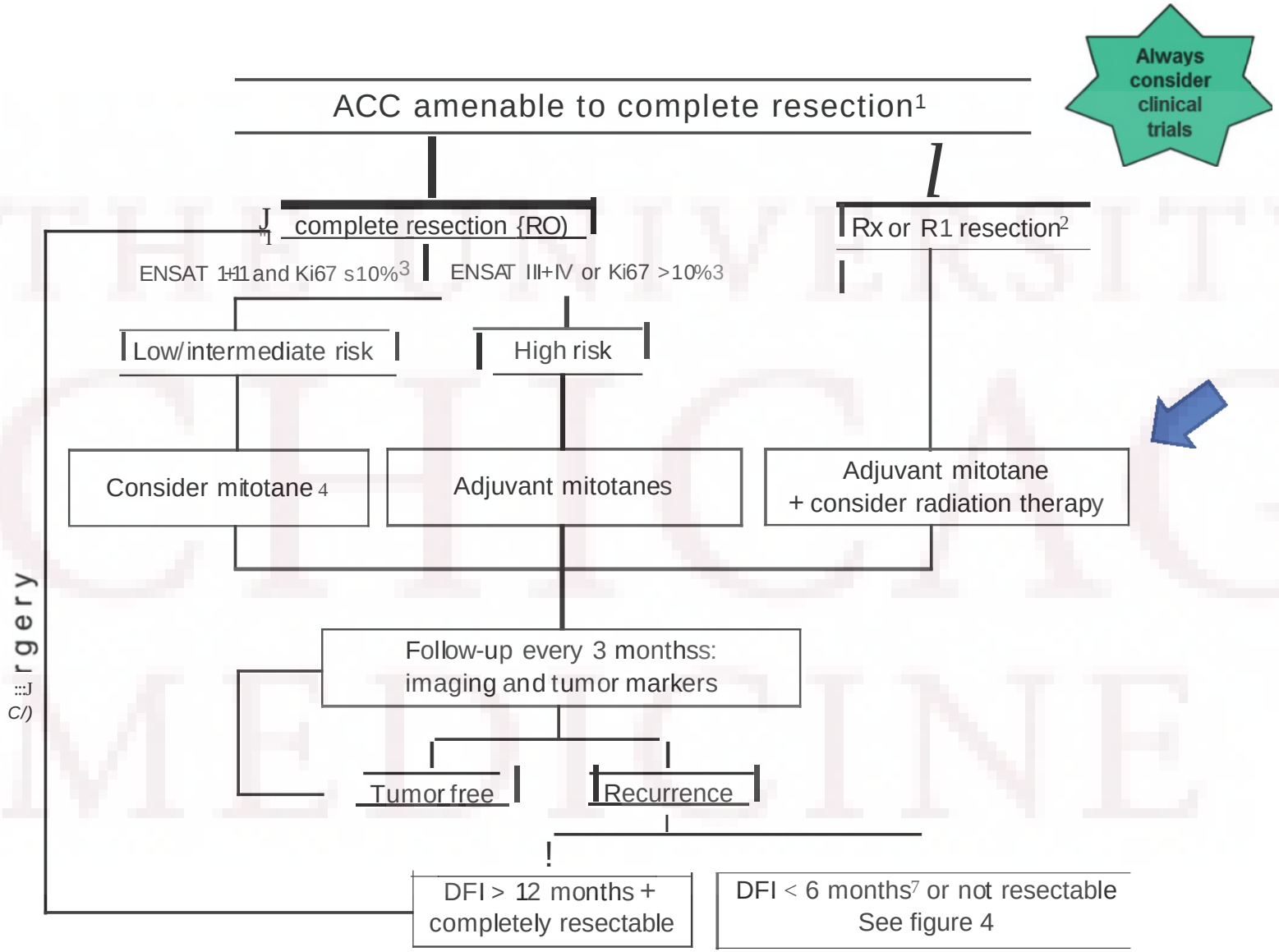


FIGURE 2. Five-year overall survival for all patients stratified by (A) tumor size, (B) nodal status, (C) distant metastases, (D) tumor grade, (E) surgery, and (F) margin status is illustrated.

Cancer. 2008 Dec 1;113(11):3130-6.

Key treatment modalities of adrenocortical carcinoma



Eur J Endocrinol. 2018 Oct 1;179(4):G1-G46.


Adrenocortical Carcinoma in the United States

Treatment Utilization and Prognostic Factors

TABLE 2
Treatment of Adrenocortical Carcinoma and Tumor Characteristics of Patients Who Underwent Resection

Treatment and Characteristics	No.	%
Treatment modality		
Surgery only	2284	57.4
Surgery and chemotherapy	398	10.0
Surgery and radiation	168	4.2
Surgery, radiation, and chemotherapy	70	1.8
Radiation and chemotherapy	59	1.5
Radiation only	78	2.0
Chemotherapy only	306	7.7
No treatment	494	12.4
Unknown	125	3.1
Surgical procedure		
Resection	1670	57.2
Resection with contiguous organ	819	28.0
Debulking	101	3.5
Surgery NOS	330	11.3
Tumor characteristics		
Median size (interquartile range)	10 (8-15) em	
Nodal metastases*	190	26.5
Distant metastases	330	11.3
Poorly differentiated tumorst	338	15.2
Involved resection marginst	411	19.4

NOS indicates not otherwise specified.

*716 patients had a pathologic nodal status reported.

t2224 patients had a tumor grade reported.

t2119 patients had a margin status reported.

Cancer. 2008 Dec 1;113(11):3130-6.

Additional considerations while on mitotane therapy

What is the ideal duration of therapy?

What is the appropriate dose and monitoring?

Toxicities often limit therapy: fatigue, nausea, vomiting, anorexia, hypercholesterolemia

Mitotane inhibits production of cortisol and aldosterone (after several months).

Mitotane has a long half life (months) and induces hepatic cytochrome P450, which induces metabolism of cortisol, corticosteroids and fludrocortisone.

Mitotane increases SHBG and TBG and can suppress TSH secretion.

endocrine evaluation

March 2019

*Cortisol 10.3 ug/dL

Aldosterone: 7.1 ng/dL
Renin: <0.6

ACTH: 18.2 pg/mL

Testosterone binding globulin: 78 nmol/L
Free testosterone: 54 pg/mL
Total testosterone: 316 ng/dL

TSH: 1.68 mcU/mL
FT4: 1.04 ng/dL
TT3: 89 ng/dL

*cortisol obtained at 10:30 AM, in January prior to starting mitotane

Table 2
Radiographic Characteristics Suggestive of Benign Versus Malignant Adrenal Masses

Characteristics	Likely benign	Potentially malignant
Irregular shape	No	Yes
Heterogeneous content	No	Yes
Necrosis or calcifications	No	Yes
Rate of growth	<1 em/year	>1em/year
Attenuation on unenhanced CT	<10HU	>10HU
Contrast washout on CT protocol at 15 minutes	Absolute >60% Relative >40%	Absolute <60% Relative <40%
MRI chemical shift suggestive of lipid-rich content	Yes	No
FDG avidity on PET	No	Yes
Size	<4cm	>4-6 em

Abbreviations: CT = computed tomography; FDG = fiuorodeoxyglucose; HU = Hounsfield units; PET =positron emission tomography.