Renal Cancer: Symptoms, diagnosis, pathology & prognosis

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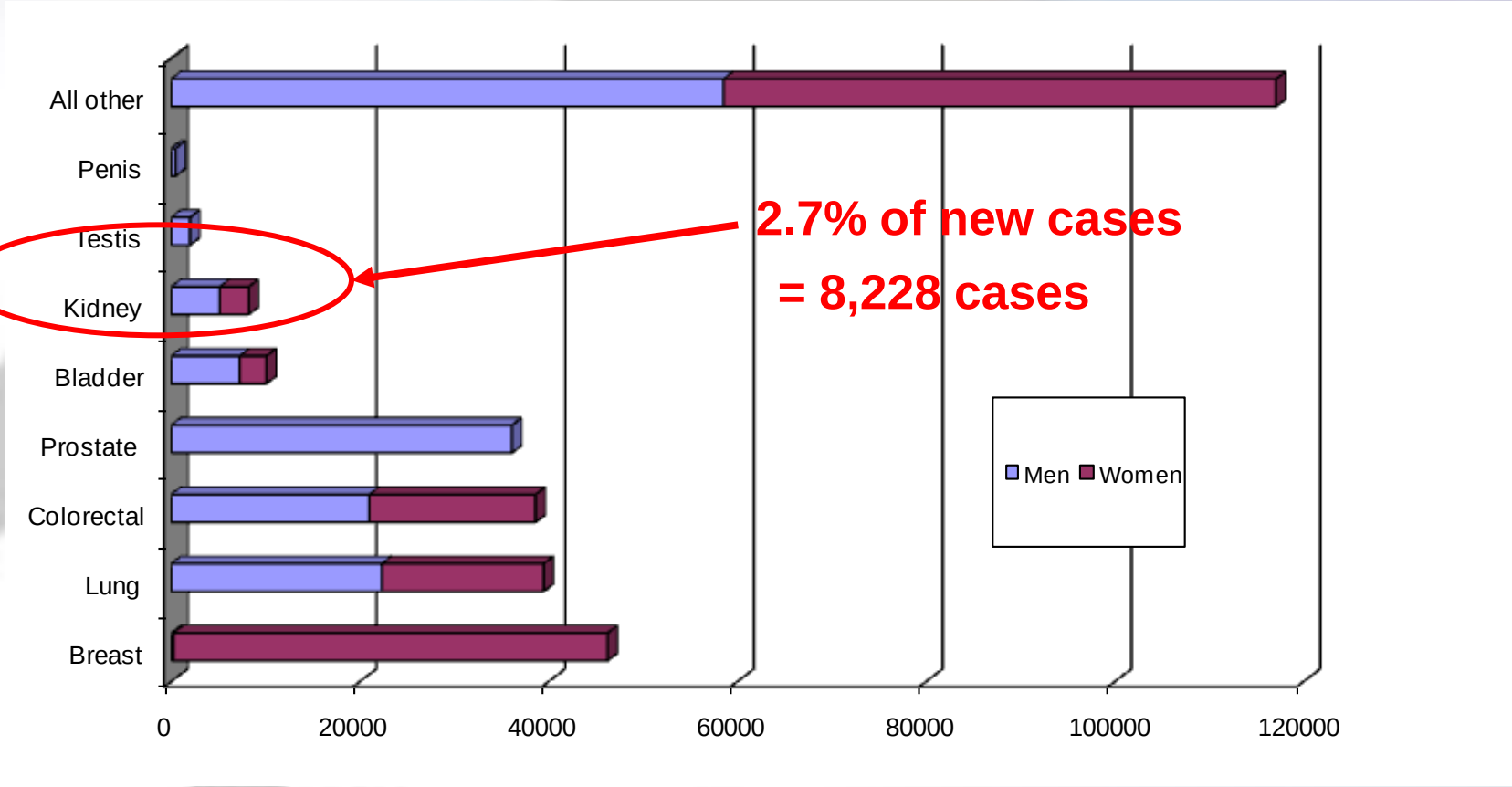
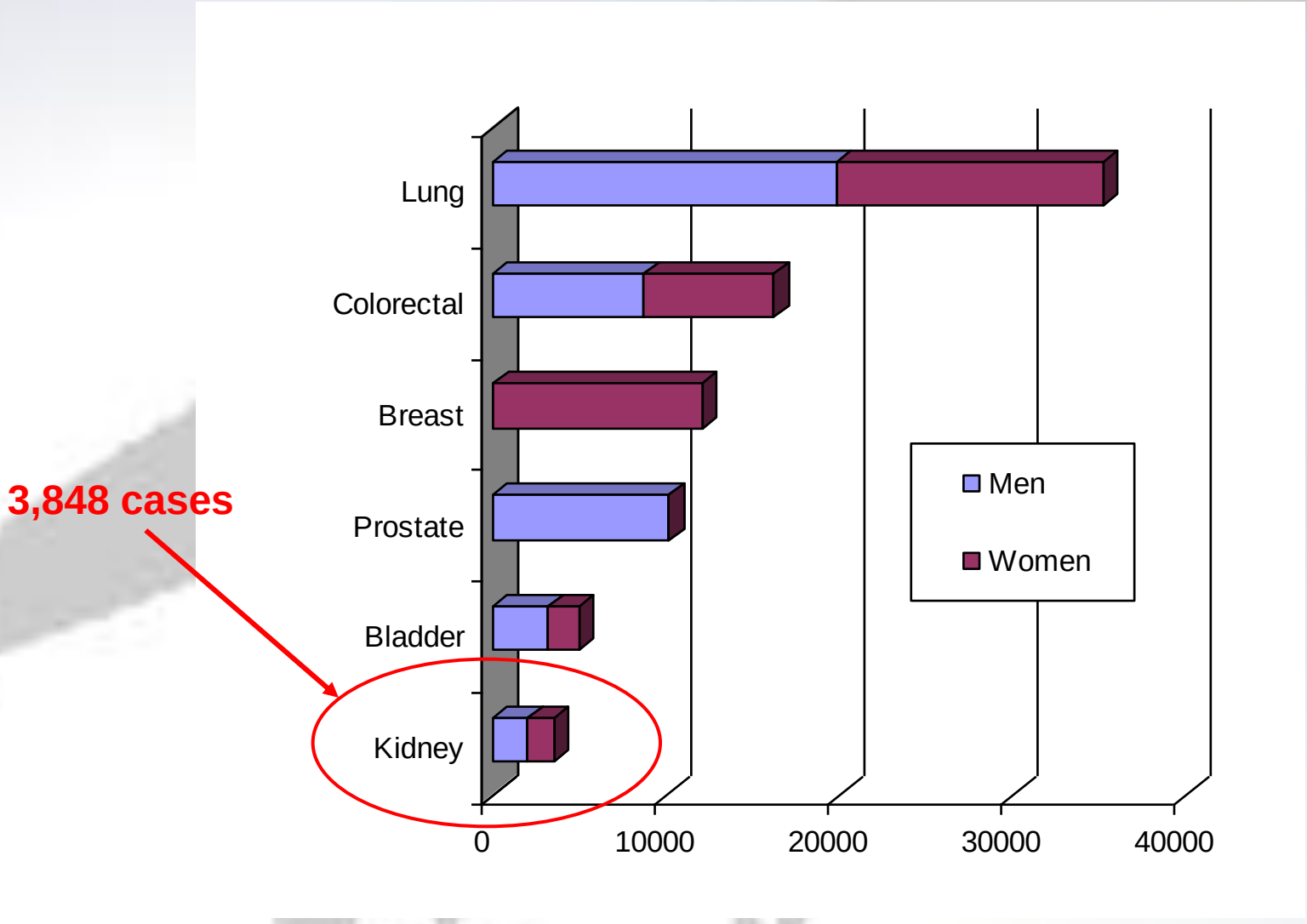
Plan for today:

- How renal tumours present
- What investigations are needed and why
- What types of tumours are found
- How stage & grade can help predict outcome

UK Incidence 2007



UK Mortality 2008



Renal cancer

- The incidence continues to rise
- Peak in ages 60 -70
- Male:Female: 1.6 to 1

Patients present in various ways:

- No symptoms
- Symptoms from the primary tumour
  - ‘paraneoplastic syndromes’
- Symptoms from metastatic tumours

‘incidental’ tumours

- Before CT & US around 7% of tumours were detected incidentally
- In modern series up to 80% are incidental finding on US / CT (& increasingly MRI)
- Metastatic as well as primary tumours may be detected incidentally

Paraneoplastic syndromes:

- In up to 20% of cases
  - High ESR
  - Polycythaemia
  - Hypercalcaemia
  - Hypertension
  - Pyrexia
  - Cachexia
  - Stauffer’s syndrome

Stauffer's syndrome:

- 3-20% incidence
- Elevated alkaline phosphatase
- Prolonged PT time
- Hypoalbuminaemia
- Elevated bilirubin & transaminases

- Normalises in 70% post nephrectomy – perisistence is a poor prognostic sign (indicates viable tumour)

Symptoms from the primary:

- Virchows Triad – the ‘too late triad’:
  - Haematuria
  - Flank pain
  - Abdominal mass

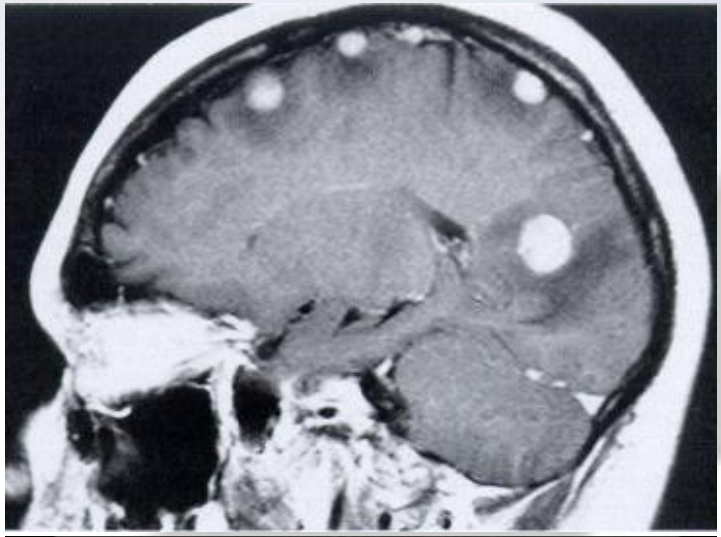
- Now a far less common presentation of RCC
  - 9% in 1970 3% in 1995

Presenting symptoms in 1990s*:

• Haematuria	26%
• Flank pain	35%
• Abdominal mass	7%
• Weight loss	12%
• High ESR	20%
• Anaemia	16%
• Varicocele	1%

***Sunela et al BJUI Intl Sept 201**0

Metastatic disease



Metastatic disease:

- 20% of patients have metastatic disease at presentation
- Metastatic disease is often asymptomatic at presentation
- Can spread to almost any organ

Common sites of spread:

Organ	Cleveland, USA	France	New York, USA
Lung (%)	73	74	72
Bone (%)	32	32	26
Retroperitoneal Lymph nodes (%)	27	26	20
Brian (%)	4	2	Not given
Mediastinum (%)	Not given	Not given	23

Diagnosis:

- Tumour markers for kidney cancer are currently unavailable
- No blood test will make the diagnosis

Useful blood tests:

- FBC
  - Anaemia
  - Erythrocytosis
- Bone biochemistry
  - Hypercalcaemia
- Liver Function Tests
- ESR
- Creatinine

Diagnosis by imaging:

- Incidental tumours are commonly found on ultrasound (US) perfomed for other reasons

- Suspicous lesions must be further evaluated with a correctly performed CT scan (or MRI)

Renal Mass Protocol CT

- A renal protocol multidetector CT scan is recommended for further diagnostic imaging, unless the patient cannot tolerate iodinated contrast agents
- Sections through the abdomen and chest
- It should not be routine to image the pelvis

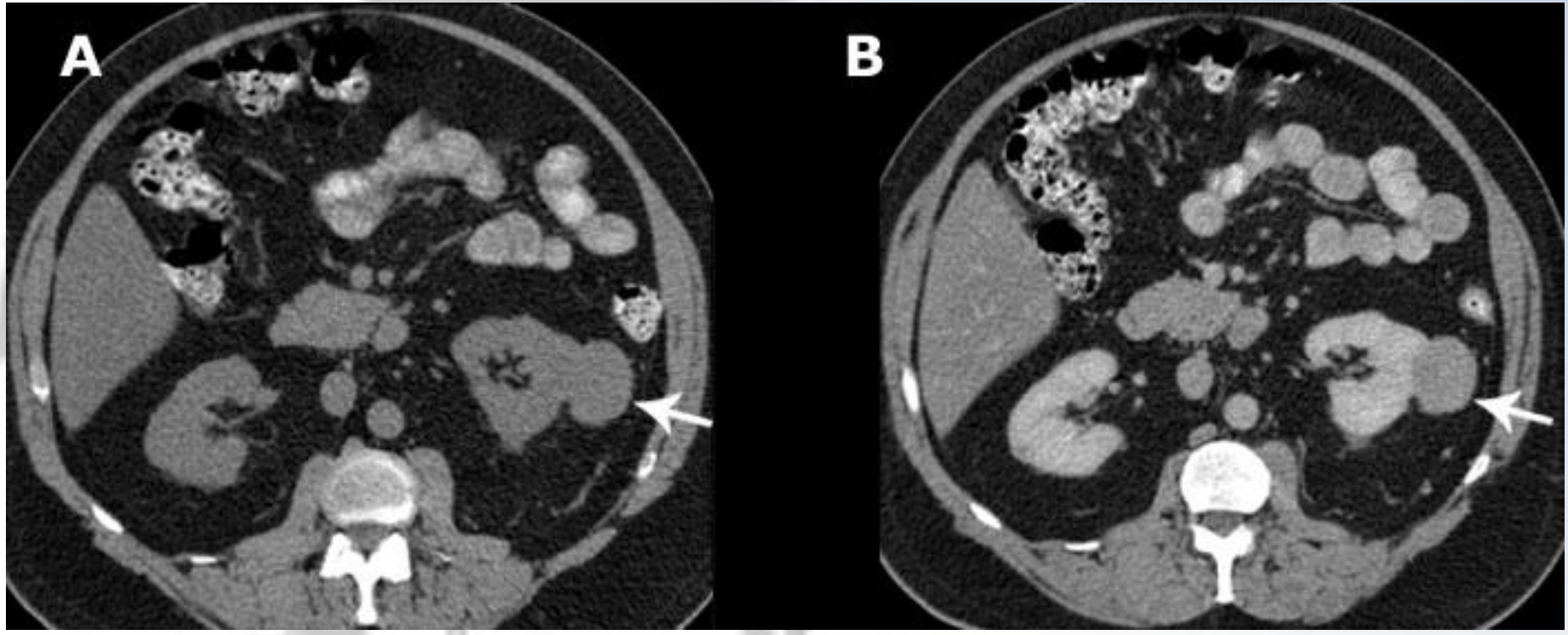
Three sets of images (phases):

1. Non-contrast phase
2. Injection of IV contrast
3. Corticomedullary (arterial) phase at 40 seconds
4. Nephrographic phases at 100 seconds

- 3-D reconstruction of the corticomedullary phase shows the vasculature, which can be useful for surgical planning
- It is usually combined with a non contrast CT of chest

Renal mass protocol CT:

- CT image prior to intravenous contrast admin (A) demonstrates a 3.5 cm mass (arrow) in the left kidney. This measures 39 Hounsfield units corresponding to soft-tissue density. After administration of intravenous contrast (B), the mass (arrow) demonstrates enhancement increasing to 68 Hounsfield units



Enhancment?

- The **Hounsfield scale**, named after Sir Godfrey Hounsfield is a quantitative scale for describing radiodensity on CT scans
- The scale is defined in Hounsfield units (symbol **HU**), running from air at −1000 HU, through water at 0 HU, and up to bone at +400 HU and more
- Significant enhancment in renal tumours is defined as an **increase of 15 Hounsfield units** or more

Bosniak Classification

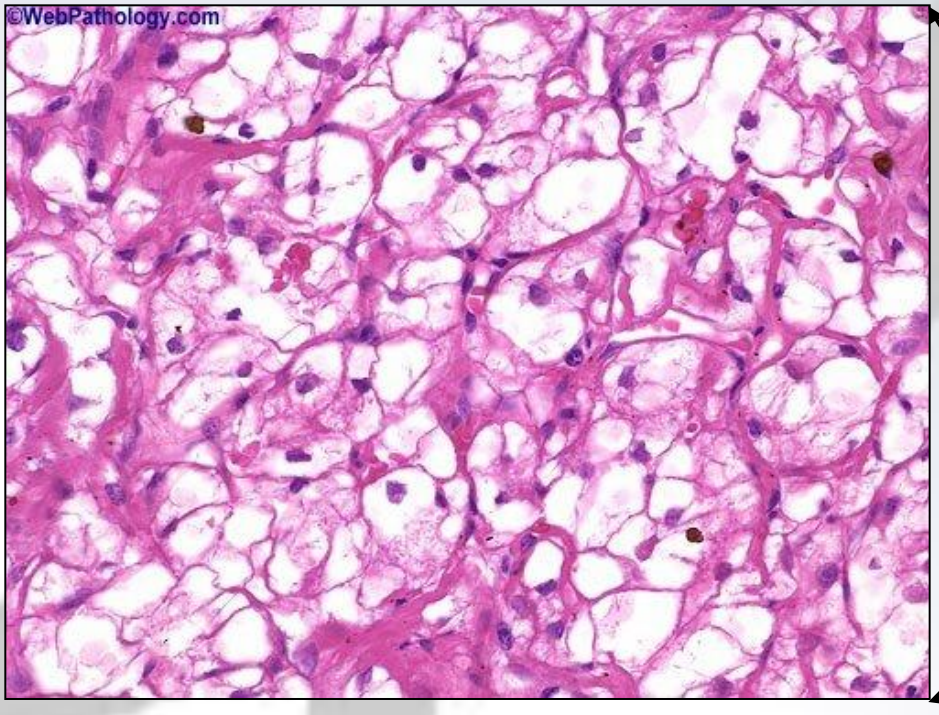
Category	Definition	Malignant histology (%)
1	Simple benign cyst – thin walled no septa or calcification or solid elements. Water density. No enhancement	<1
2	Benign cyst with a few thin septa fine calcification. No enhancement	5
2F	Cysts with more hairline thin septa. Minimal thickening of septa or wall. Some focal thick or nodular calcification. No enhancement	? Up to 18%
3	Indeterminate cystic masses with thickened irregular walls or septa in which enhancement can be seen	50
4	Clearly malignant with cystic lesions that contain enhancing soft tissue components	93

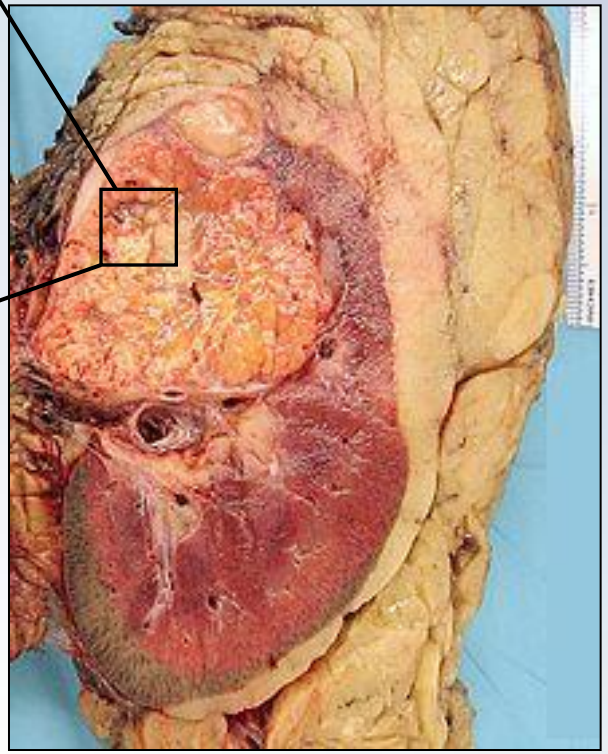
Additional imaging:

- Isotope bone scan: If alkaline phosphatase is elevated or c/o bone pain
- USS/MRI: if there is a concern about caval extension
- Cavography is rarely used to assess IVC

- Isotope renogram if renal dysfunction is present or contralateral kidney looks small and/or scarred
- CT Head for unexplained CNS symptoms
- Echocardiography may help in cases where atrial extension is suspected

Pathology:





Pathology: Histologic subtypes

Renal Cancer	Frequency (%)	Origin	Prognosis
Clear Cell	70-80	Proximal renal tubule	Hypervascular More aggressive than papillary or chromophobe Assd with VHL
Papillary (chromophilic)	10-15	Proximal renal tubule	Multifocal Variable prognosis
Chromophobe	5-10	Intercalated cells	Better prognosis
Collecting duct (Bellini duct)	1-2	Collecting duct	Infiltrative Poor prognosis
Neuroendocrine	<1	variable	
Not classified	1-3		

TNM Classification 2002 (6th Ed)

- T1 7cm or less limited to kidney
  - T1a 4cm or less
  - T1b more than 4cm but not more than 7cm
- T2 more than 7cm limited to kidney
- T3
  - T3a Invades adrenal or peri-nephric tissue but not beyond Gerota
  - T3b into renal veins or vena cava below diaphragm
  - T3c Into vena cava above the diaphragm
- T4 Tumour directly invades Gerotas fascia

Robson stage

				5 yr survival (%)
Stage I	T1-T2	N0	Tumour within capsule	70 – 90
Stage II	T3a	N0	Invading fat (confined to Gerotas)	60 – 80
Stage III	T3b T3c	N1 N2	Lymph nodes and/or vena cava	0 – 20 40 – 60
Stage IV	T4	M1	Adjacent organs or distant mets	1 - 10

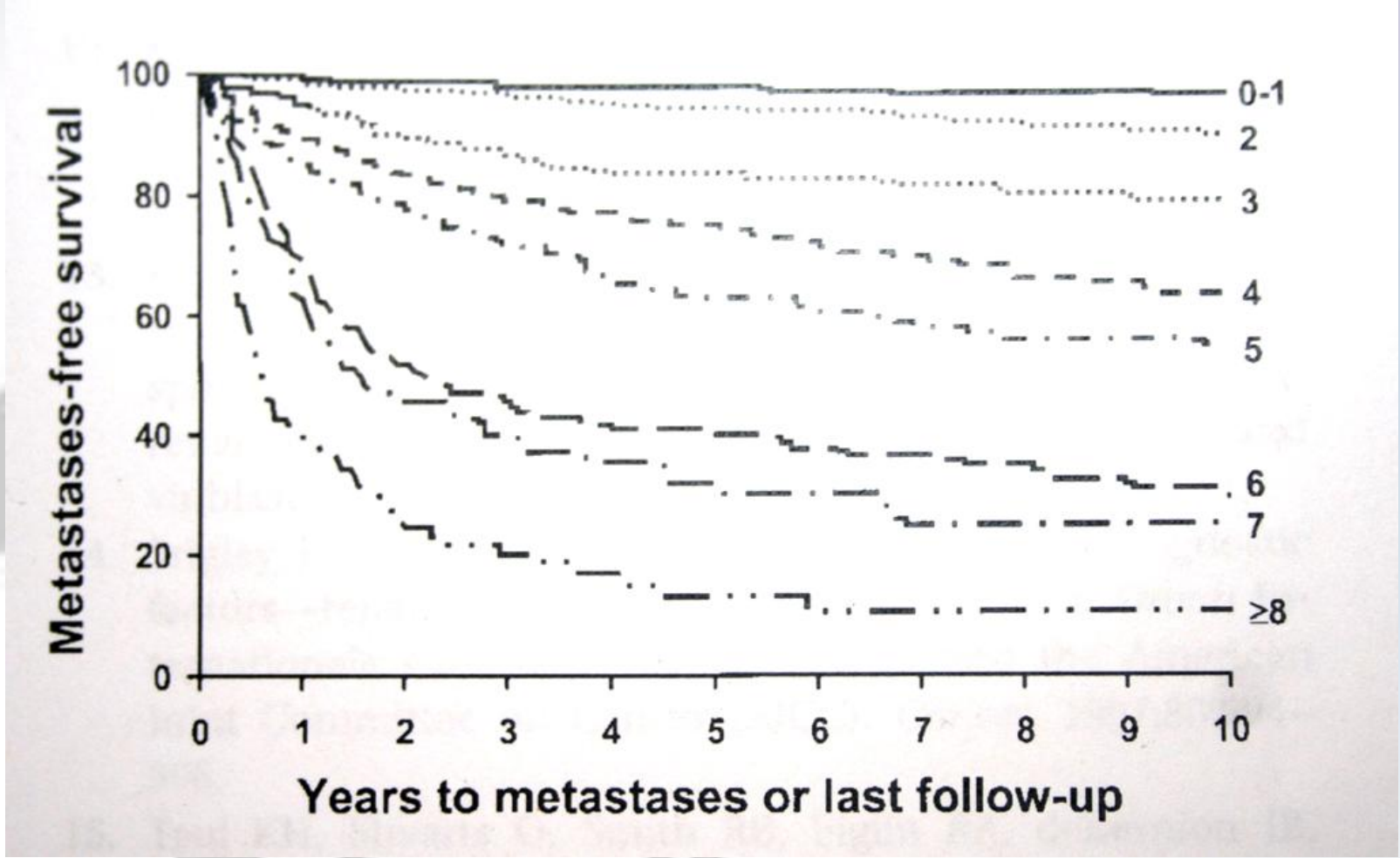
Leibovich (Mayo) Score

- Pathological T stage 0-4
- Nodal status 0-2
- Tumour size
  - <10cm 0
  - >10cm 1
- Nuclear Grade 0-3
- Histological tumour necrosis 0-1

Scores from 0 – 11 Low=0-2, Intermediate=3-5 & High=6 or more

Leibovich et al; Cancer 2003

Leibovich score & outcome:



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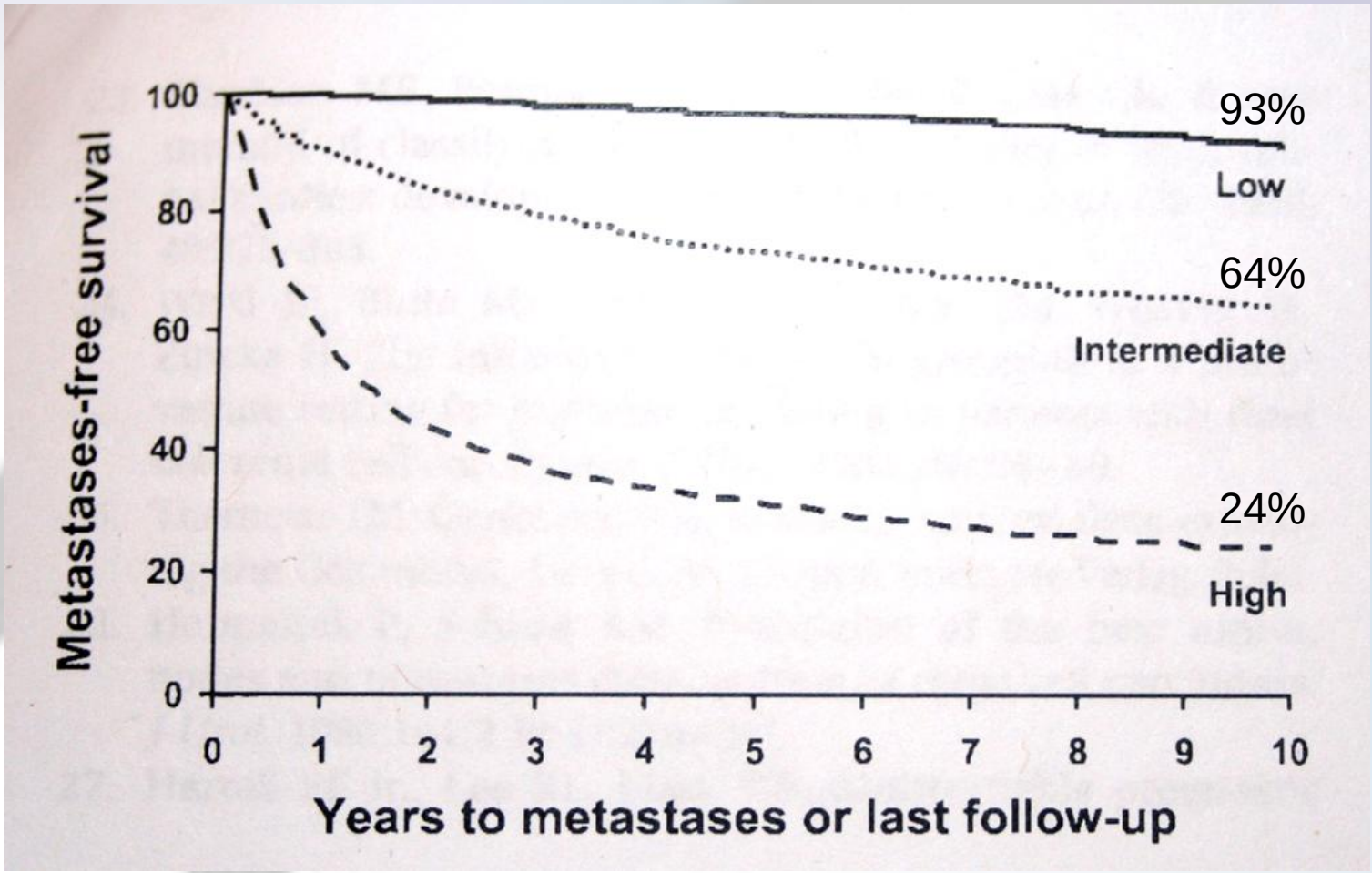
Survival by risk group:



Low risk = 0-2 Intermediate risk = 3-5 and high risk = 6 or higher


Thank You