

Tumours Markers and Cancer

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The Use of Tumour Markers

- Diagnostic
- Triage
- Prognostic [Staging/Outcome]
- Therapeutic Response
- Relapse

Serum Tumour Markers

Breast	CA-15-3; CEA; CYFRA 21-1
Ovary	CEA; CA 125; CA 19-9; AFP; BHCG
Uterine	SCC; CYFRA 21-1; CEA; CA 19-9; CA 125
Prostate	PSA; FPSA and ratio
Testicle	BHCG; AFP
Colorectal	CEA; CA 19-9; CA 125
Pancreas	CEA, CA 19-9; CA 72-4
Liver	AFP; CEA
Stomach	CA 72-4; CEA; CA 19-9
Esophagus	CEA; CYFRA 21-1
Thyroid	CEA; NSE
Lung	NSE; CYFRA 21-1; CEA; CA 125; CA 19-9
Bladder	TPA; CEA; CYFRA 21-1

PSA

Facilitates triage when enlarged prostate encountered.

- Requires prostate biopsies
- False + with benign hypertrophy/UTIs
- Useful for monitoring response to therapy

PSA

	Total Serum PSA	UPM3 Urine Test[PCA3]
• Sensitivity	87%	82%
• Specificity	16%	76%
• PPV	40%	69%
• NPV	65%	87%
• PSA cutoff 4-10ng/ml		

PSA

- Who should have it tested??
- Family History of Prostatic Cancer – start aged 40-45 yrs
- General Population > 50 yrs with digital examination.
- Yearly Testing
- Cochrane Review – no evidence to support mass screening![Jul 2006]

PSA

- 3 ng/ml or less is considered to be in the normal range for a man under 60 years old
- 4 or less is normal for a man aged 60-69
- 5 or less is normal if you are aged over 70
- Who should have PSA?
- Over 50 years
- Family History – start at 40-45 years

Note 2/3 men with raised PSA do not have prostatic cancer

CEA

- In follow-up – levels can be raised before tumour detection [**sensitivity of 58%**], with a lead time of 1-30months
- 80% sensitivity in detecting liver metastases.

CEA ,CA19.9 and colonic cancer

- Elevated CEA – risk of malignancy – not for screening purposes
- Elevated CA19.9 – also indicator of mainly upper bowel carcinomas
- Both have prognostic value in treated patients [based on pre-operative levels]
- Both can be use to monitor response

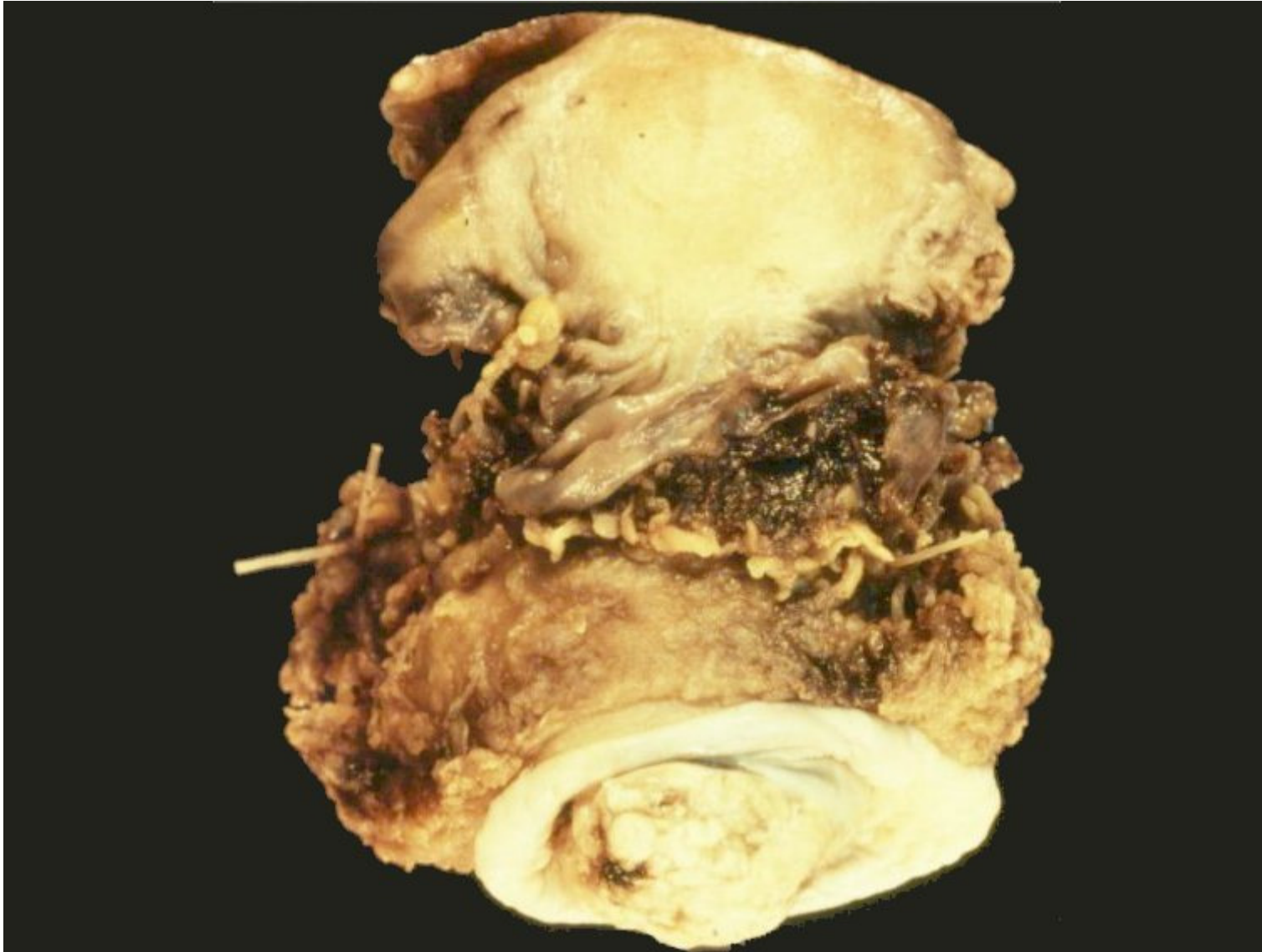
CA15.3

- Elevated in about 10% of women with early stage disease and 70% with advanced disease.
- Can be used to monitor disease response and in follow-up some undertake yearly levels.

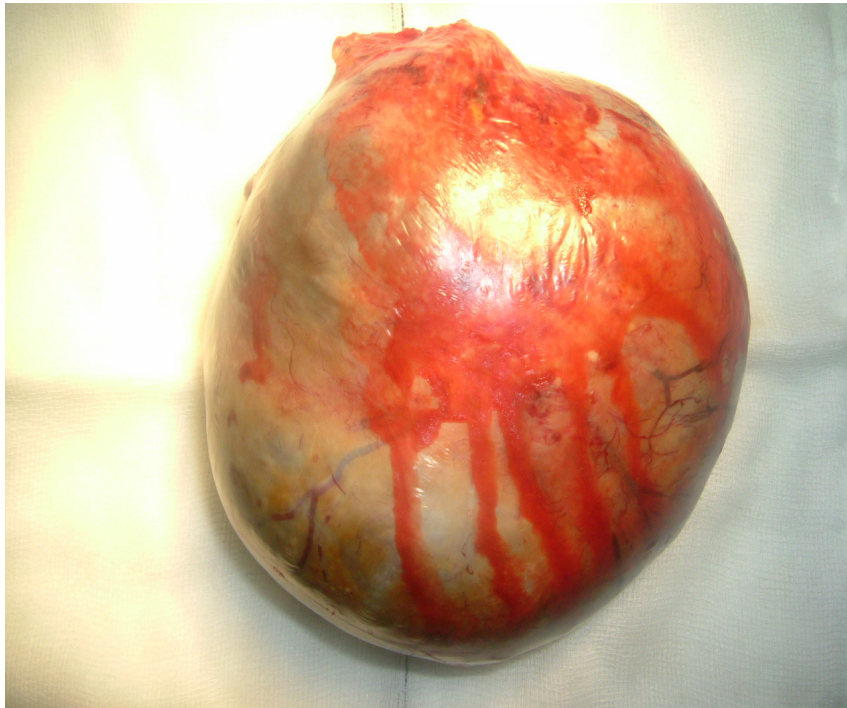
CA19.9

- Elevated in:
- Upper GI disease
- Pancreatic Cancer
- Peritoneal Cancer
- Ovarian Cancers
- Liver Metastases

Cervical Cancer SCC and Squamous Cancers



Ovarian Cancer



Sr. Josephs Nodule



BHCG/AFP

- Germ Cell Tumours [part of the 'triage' of patients with suspected ovarian cancer <40 years of age]
- In men –with suspected testicular cancer
- Choriocarcinomas/Molar Pregnancies [bHCG]

CA125

- Elevated by any epithelial cell damage
- Endometriosis
- Peritoneal Infection
- Pregnancy
- Surgery
- Pneumonia
- Sarcoidosis
- Other malignancies – Breast Ca, Pancreatic, Bowel etc.

CA125

- For Screening ?
- Triage: RMI [Risk of Malignancy Index]
- Ca125 level X Ultrasound Score X Menopausal Status

RMI

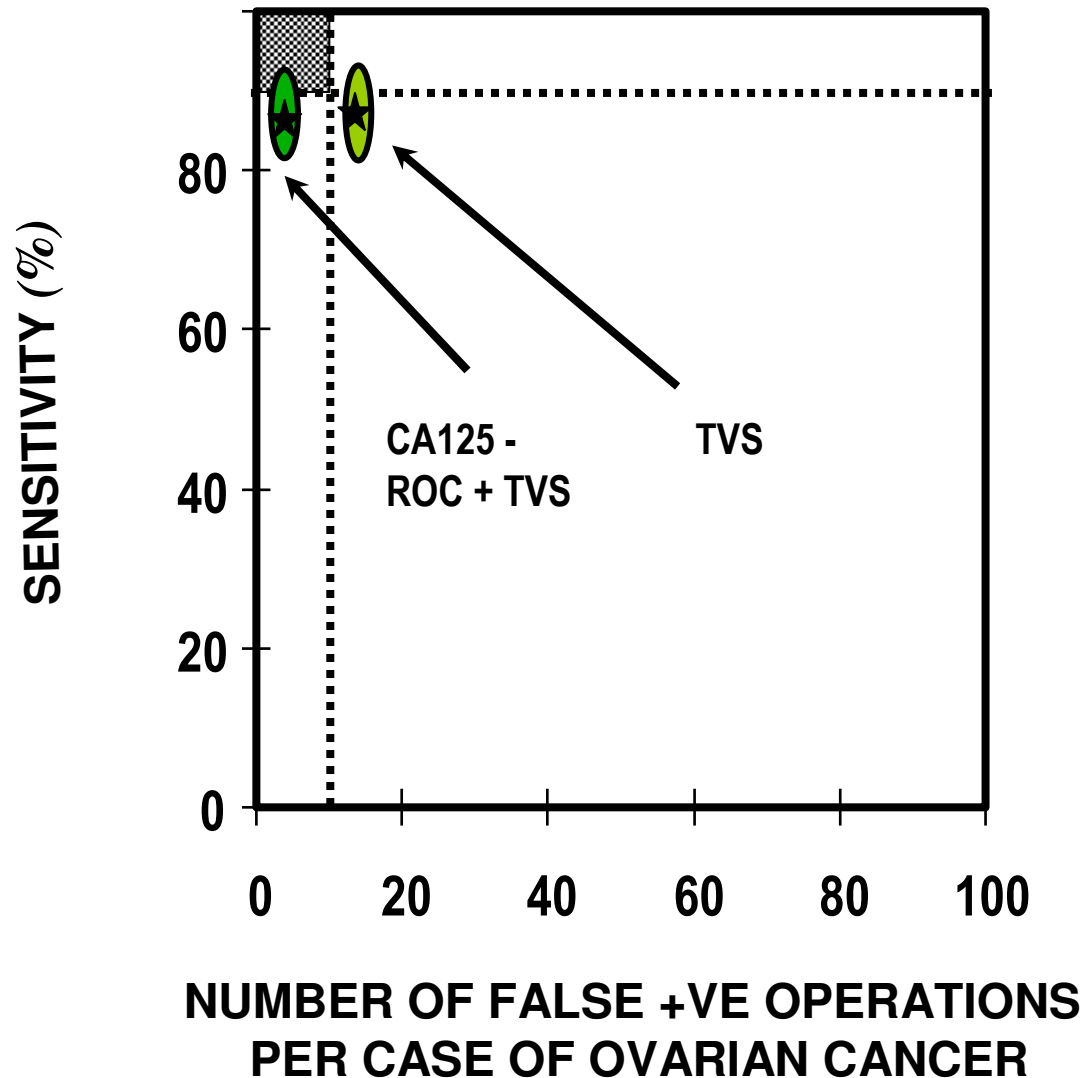
- **Risk of Malignancy Index for Ovarian Cancer**

		Score
• Menopausal Status		
•	Pre	1
•	Post	3
• *Ultrasound findings		
•	Normal	0
•	Multilocular cyst	1
•	Bilateral cysts	1
•	Solid components	1
•	Ascites	1
•	Metastatic disease	1
• CA125		
•	Serum Level	

- **RMI is calculated by M x U x CA125 level =**

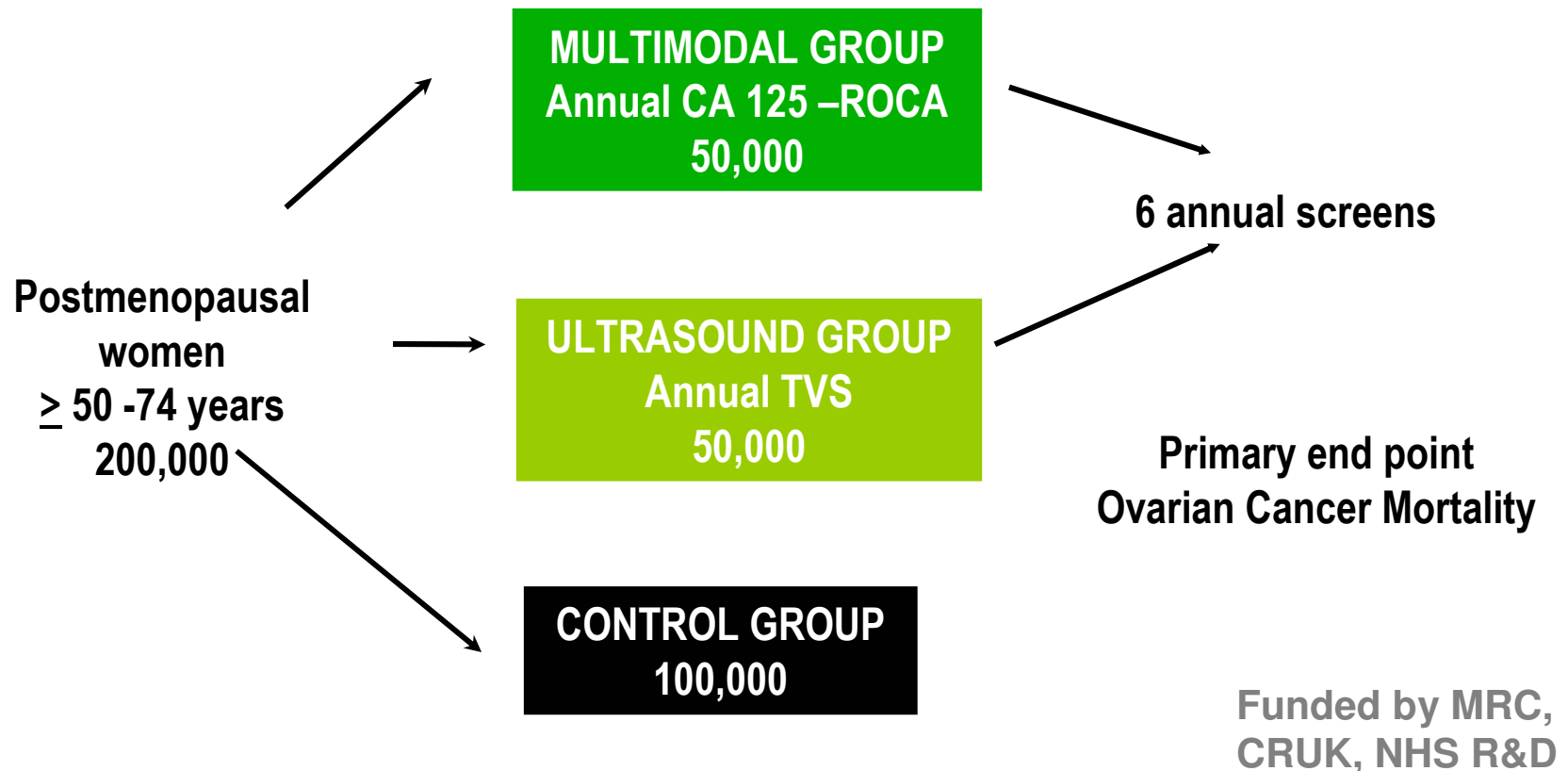
- *Maximum score =3
- Score to 100 – about 3% risk of cancer
- Score 100-200 – 25-30% risk
- Score >200 – 80% +
- Clinical situation must be considered.

Performance Of Screening Strategies



Postmenopausal women with an annual incidence of Ovarian Cancer of 40/100,000

UK Collaborative Trial Of Ovarian Cancer Screening (UKCTOCS)

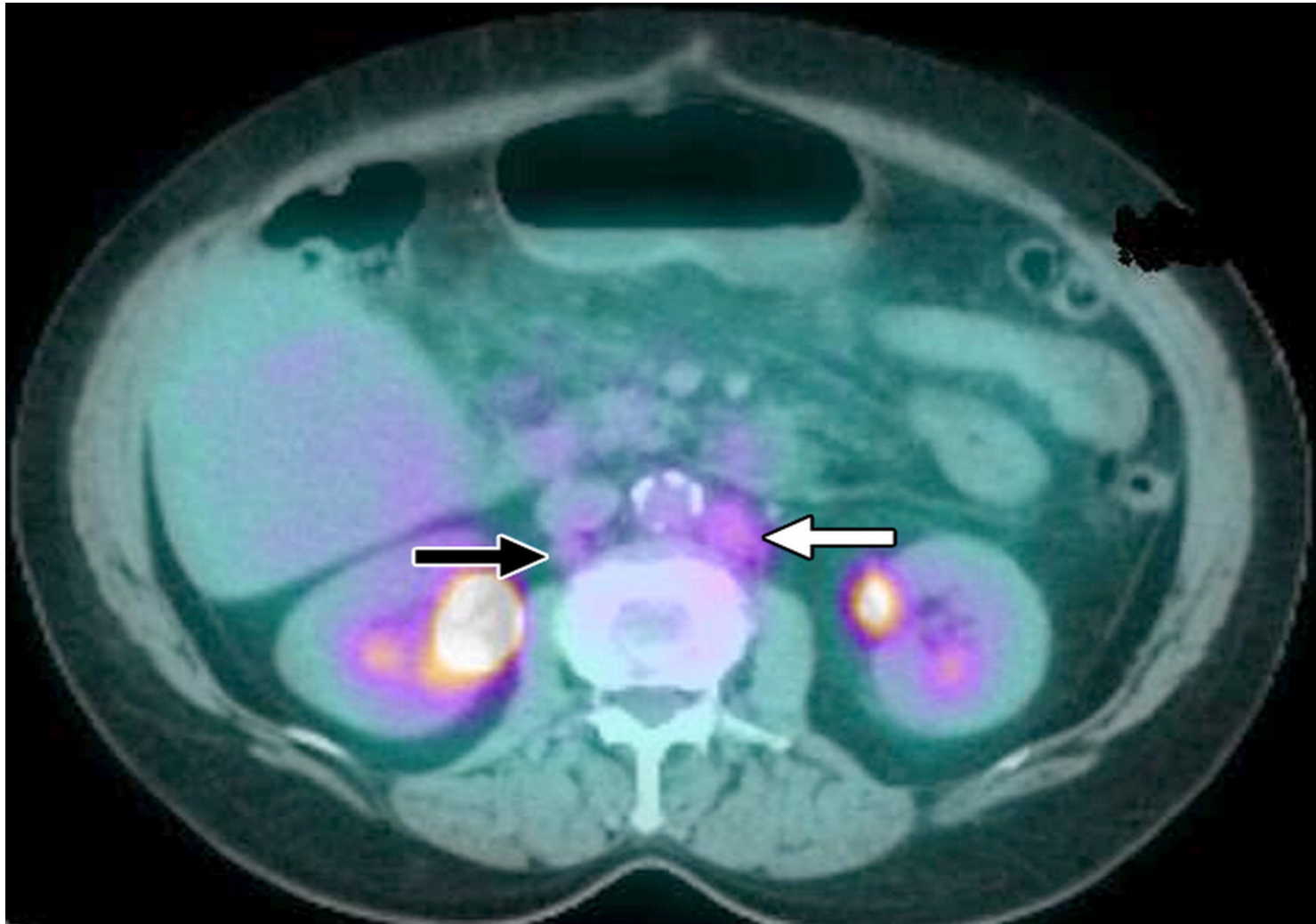


All women followed up for 7 years via ONS as well as postal questionnaires

CA125

- During follow-up CA125 used [in those with elevated CA125 pre-operatively]
- Elevated CA125 may precede clinical disease detection by 3 months or more
- EORTC randomised trial near completion
 - on treatment on rising CA125 vs Clinically apparent disease.

PET/CT – and Para-aortic nodes in Ovarian Cancer



Tumour Tissue Marker

- Oestrogen/Progesterone Receptor Status
- Her-2 neu [herceptin target]
- VEGF receptor [anit-vegf therapies]

- Prognostic
- Ploidy, P53,

Conclusions

- Most tumour markers are used in the situation where disease is clinically suspected.
- PSA is employed for screening
- CA125 – MAY be used in screening in the future
- Tumour markers have an important role in prognosis, monitoring response and disease status.

