Regional Training Course on Hybrid Imaging: SPECT/CT, PET/CT, and Sentinel Node Detection
(C7-RER-6.026-024)
Pärnu - Estonia - October 6-10, 2014

SPECT/CT AND THE SENTINEL NODE IN AREAS OF COMPLEX ANATOMY

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SENTINEL NODE
EVOLUTION CLINICAL INDICATIONS

AREAS OF COMPLEX ANATOMY

HEAD & NECK

ORAL CAVITY CANCER
MELANOMA

PELVIS & ABDOMEN

PROSTATE
TESTICLE
KIDNEY
BLADDER

CERVIX
ENDOMETRIAL
GASTROINTESTINAL

THORAX

PULMONARY - OESOPHAGEAL
HEAD & NECK

ORAL CAVITY CANCER
MELANOMA

SENTINEL NODES
IN AREA HIGH LYMPH
NODE DENSITY

300 LYMPH NODES
6 NECK LEVELS / SIDE

SHORT DISTANCE
BETWEEN INJECTION
SITE AND SN

SHORT DISTANCE
BETWEEN INJECTION SITE AND SN

PERIAURICULAR
MELANOMAS
&
PAROTID AREA
LEVEL II

FLOOR OF MOUTH
CARCINOMA
&
LEVELS I - IIa
Early, and intense draining hot spots corresponding to more lymph nodes on CT

Highly suggestive for SN clusters

 Necessary to be discussed with surgeon

SN cluster
LYMPHOSCINTIGRAPHY
- SMALL INJECTION VOLUMES
- DYNAMIC STUDY
- EARLY AND DELAYED PLANAR IMAGES (ANTERIOR/LATERAL)
- TRANSMISSION IMAGES (Co / Tc) TO IMPROVE ANATOMICAL RECOGNITION
- CONTRAST ADJUSTMENT IN THE CASE OF NEAR-THE-INJECTION-SITE SNs
- SN MARKING IN SURGICAL POSITION (ASSITED OR NOT BY PORTABLE GAMMA CAMERA)

SPECT/CT
- FOLLOWING DELAYED PLANAR IMAGES
- 2 mm SLICES
- FUSION SPECT/CT IMAGES EVALUATED (ADEQUATE CONTRAST) TOGETHER WITH CT OF SPECT/CT
- 3D SPECT/CT IMAGES FOR GLOBAL ANATOMICAL RECOGNITION
- TOPOGRAPHICAL SN LOCALIZATION FOLLOWING SURGICAL HEAD/NECK COMPARTIMENTS AND LYMPH NODE GROUPS

HEAD & NECK

TRACER REINJECTION?
SPECT/CT?
LATE PLANAR IMAGES?
OTHER INTERVENTIONS?
ADDED VALUE SPECT/CT
N = 38
16% ADDITIONAL SNs
55% ADJUSTMENT
SURGICAL PROCEDURE
TRACER REINJECTION? LATE PLANAR IMAGES? OTHER INTERVENTIONS?

SN VISUALIZATION USING HIGH RESOLUTION PORTABLE GAMMA CAMERA

CAMERA AT 15 cm FROM SKIN

CAMERA AT 1 cm FROM SKIN

SN MARKED ON SKIN
NEAR-THE-INJECTION-SITE SENTINEL NODES

PERIAURICULAR
(PAROTID - LEVEL IIB)

FLUOR OF MOUTH
(LEVELS I & IIA)

INTRAMAMMARY

AROUND SCAPULA

TRUNCAL ECTOPIC SNs
(INTERCOSTAL DORSAL, PERIMUSCULAR)

DETECTION SN N THE VICINITY OF THE INJECTION SITE

14 mm (at a distance of 12 cm)

7 mm (at a distance of 8 cm)

10 mm

3 mm (pinhole 2.5mm)

5 mm (pinhole 4mm)
SENTINEL NODES IN AREAS OF COMPLEX ANATOMY

PELVIS & ABDOMEN
PROSTATE CANCER
TESTICLE
KIDNEY
BLADDER

CERVIX
ENDOMETRIAL
GASTROINTESTINAL

PROSTATE CANCER
CLINICAL INDICATION - INTERMEDIATE RISK PATIENTS
T2b/T3 or PSA >10ug/l or Gleason >6

**OPEN SURGERY**
4 SERIES (N=23-2020)
2407 PATIENTS

**IDENTIFICATION 98%**

**FALSE NEGATIVE RATE 5.5%**
(1 SERIE)

**LAPAROSCOPY**
4 SERIES (N=28-203)
492 PATIENTS

8.5% FALSE NEGATIVES
(1 SERIE)

**COMBINED DETECTION RATE 94% (N = 21 STUDIES)**
**COMBINED SENSITIVITY 94% (N = 15 STUDIES)**
SENTINEL NODES OUTSIDE EXTENDED PELVIC LYMPHADENECTOMY AREA (EPL)

N=121
49 PATIENTS WITH METASTASES (40%)
37 PATIENTS WITH SN OUTSIDE EPL AREA (31%)
5 SN (2 EXCLUSIVELY) OUTSIDE EPL RESULTED TUMOR (+)

SENTINEL NODE BEHIND COMMON ILIAC ARTERY
SENTINEL NODES IN AREAS OF COMPLEX ANATOMY

NEW TECHNOLOGICAL CHALLENGE
SPECT/CT BASED
MIXED REALITY

A TAXONOMY OF MIXED REALITY VISUAL DISPLAYS
PAUL MILGRAM & FUMIO KISHINO

MIXED REALITY
REALITY AUGMENTED
REALITY AUGMENTED
VIRTUAL VIRTUALITY ENVIROMENT

"VIRTUALITY CONTINUUM"

HEAD-MOUNTED
DISPLAY
The GOSTT concept and hybrid mixed/virtual/augmented reality environment radioguided surgery

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