Image guidance in the Hybrid OR

Fagseminar Fremtidens operasjonsrom, Røros, 26-27.01.2016
Hybrid Surgery

Surgery + Intervention = Hybrid Procedures

- Treatment of even very sick or old patients
- Less complications
- Less / no following intensive care
- Improved workflow
- Optimum usage of OR capacity
Our focus in surgery is increasing...

Plastic Surgery

Gynecology

Urology

Neurosurgery

Cardiac Surgery

Eye Surgery

Oral and maxillo-facial Surgery

Thoracic surgery

Gastro-int. Surgery

Vascular Surgery

Pediatric Surgery

Ear, Nose, and Throat Surgery

Orthopedics

Traumatology
Procedures in cardiac surgery – Supported by Siemens solutions and workflows

Valve diseases
[Krishnaswamy et al., Cathet Cardiovasc Interv, 2015]

Coronary artery disease
[Greelish et al., JTCVS, 2006]

Congenital heart disease
[Glöckner et al., Card Young, 2013]

Cardiac arrhythmia
[Pison et al., JACC, 2012]

Aortic disease
[T. Kuratani, Osaka University]

Cardiomyopathy
Challenge in treatment of valve diseases –
Optimal implantation height of transcatheter valve in aortic annulus

[Fassa et al., Nat Rev Card, 2013]
Our solution – Automated TAVI workflow with *syngo* Aortic Valve Guidance

- Automatic segmentation of aortic root
- Indication of important anatomical structures
- Detection of perpendicular view for implantation and travel of C-arm into this view
- Dynamic overlay in 3D or contour mode as guidance
- Intra-operative fluoro can be overlaid also with pre-operative CT (*syngo* Fusion Package)

[ Krishnaswamy et al., Cathet Cardiovasc Interv, 2015]
Syngo EVAR Guidance*

Reduce procedure time using automated vessel wall detection

Manual segmentation, marking and labeling of branched vessels of a CT dataset for 3D image guidance is time-consuming. *Syngo EVAR Guidance* does all this automatically typically in less than one minute. It also suggests the optimal C-arm angulation for precise deployment. This helps to save dose and speed up the procedure.

*Pending 510(k) clearance*
Laparoscopic surgery

Minimally invasive partial liver resection
Hybrid OR setting
Interventional imaging during biopsies and VATS for small pulmonary nodules
Focus: Lung cancer

- Small and peripheral lung nodules are hard to biopsy and excise during VATS
- Interventional imaging in 2D and 3D can support both biopsies and VATS
Imaging during VATS for small pulmonary nodules

- Angiographic imaging in the OR allows the clear display, marking of and navigation to the nodules, followed by a precise and tissue-sparing resection.
- It replaces tactile sensing.
- Different approaches have been put into practice as to how the nodules are marked:
  - A) with contrast medium
  - B) with micro coils
  - C) with thread needles
- In case of marking with a lipophil contrast medium*, it will also drain into the lymph nodes and hence lymph node display and excision is also possible.

Courtesy: www.charite.de; Saga University, Japan
*Lipiodol, Iopamidol
Take imaging to a new level in urology
Challenge

- For laparoscopic partial nephrectomy either one or more renal arteries and/or one or more of kidney segmental arteries need to be clamped to avoid bleeding
- Without intraoperative imaging it is difficult to see which artery or arteries are feeding the tumor

Solution

- 2D and 3D imaging of kidney vessels, including tumor-feeding vessels

Results & Benefits

- Intraoperative visualization of vessels allows selective clamping of tumor-feeding vessels
- This, in turn, allows continuous perfusion of some of the healthy tissue of the kidney
Take imaging to a new level in orthopedic trauma surgery

www.siemens.com/surgery
Pelvis and peripheral bone fracture treatment –
Enhance patient outcome through high precision imaging

Acetabulum fracture

Hill-Sachs lesion with deep cartilage defect, glenoid labrum tear

High precision imaging for optimal patient care and better outcomes
Neurosurgery – image guidance for brain and spine surgery

siemens.com/neurosurgery
Scope of procedures within neurosurgery

- Neurovascular Diseases
- Emergency Surgery
- Tumor Surgery
- Pituitary Surgery
- Subcranial and Craniofacial Surgery
- Trigeminal Neuralgia
Speed. Precision. No Repetition.
High-end Imaging in Spine Surgery

www.siemens.com/spine
General trend towards minimal invasiveness enters spine surgery

Quality management is an issue in spine surgery. Misplacement of screws has many side effects. Apart from secondary operations, it puts a high strain on surgeons and institutions in terms of satisfaction, reputation and costs. Obesity and an aging population will cause a further upswing in the already high number of spine procedures in the near future.

Spine surgery done right needs high-end imaging support!