Aortic Endovascular Education

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Disclosure

Speaker name:

HERTAULT A

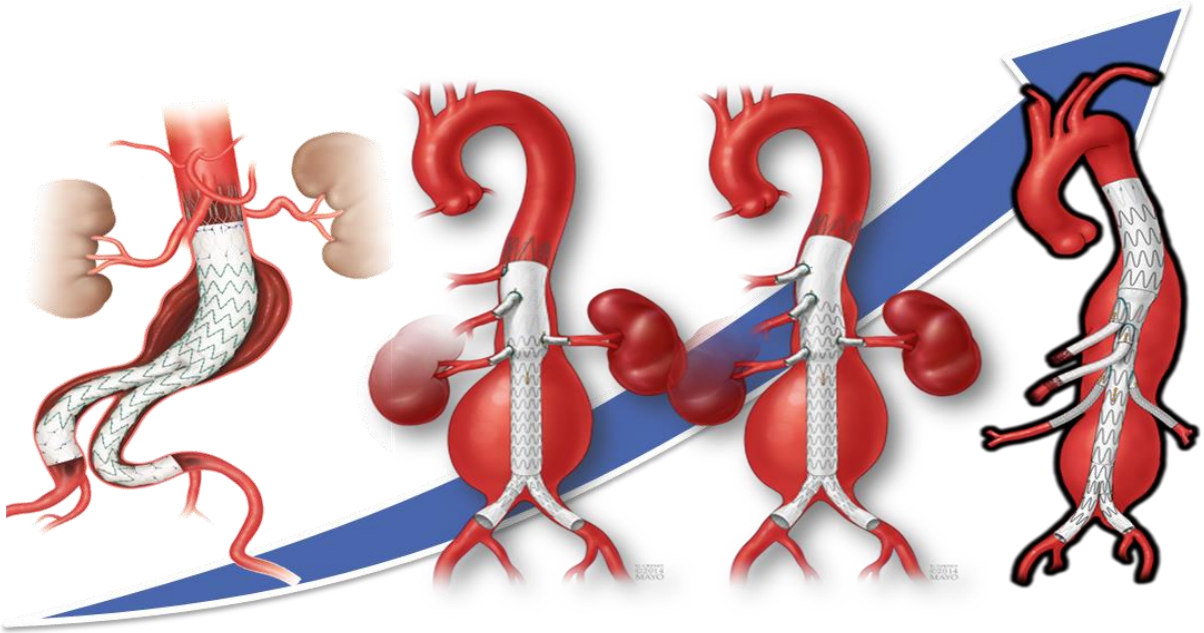
I have the following potential conflicts of interest to report:

- ☒ Consulting (GE Healthcare)
- ☐ Employment in industry
- ☐ Stockholder of a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)

- ☐ I do not have any potential conflict of interest

Introduction

INCREASED COMPLEXITY



Aortic Endovascular Education

- **Basic to advanced technical skills**
- **Procedure Planning & Image analysis Skills**
- **Radiation protection knowledge**

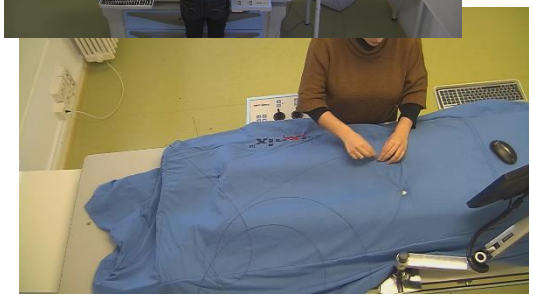
Endovascular Skills

Step by Step learning

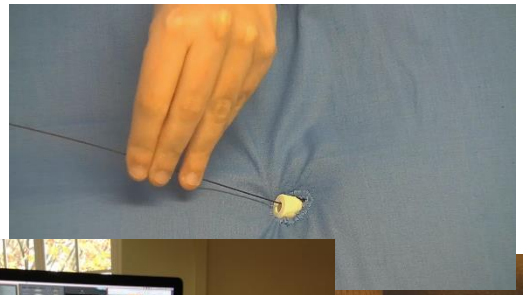
Endovascular Skills

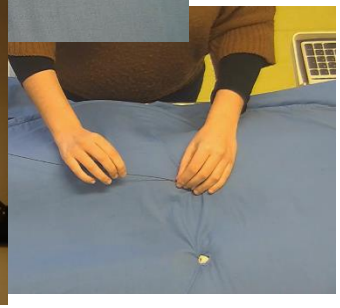
Simulation

Live simulation

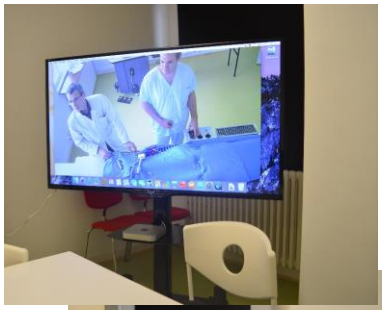


Video Capture & Control Room





Debriefing



Courtesy of Strasbourg's Surgical School

Endovascular Skills

Purposes of simulation

Acquisition of new skills

Assessment

REVIEW

Evidence for Endovascular Simulation Training: A Systematic Review

K.W.M. See, K.H. Chui, W.H. Chan, K.C. Wong, Y.C. Chan *

Division of Vascular and Endovascular Surgery, Department of Surgery, Universi
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outcomes in real clinical settings.
Methods: A literature review was performed according to the Preferred Rep
and Meta-Analyses (PRISMA) statement. All searches were done via PubM
papers that were not related to endovascular surgery and not within the s
References of review articles were further screened according to the exclusion criteria.
Results: In total, 909 records were identified and 290 duplicates were removed. Thirty-one were included in the qualitative analysis. Twenty-three were trials within simulation and most of them found statistically significant improvements in procedure time, fluoroscopy time, and contrast volume. Five were patient specific procedure rehearsals and showed that simulation significantly affected the fluoroscopy angle and improved performance metrics. Three were RCTs and revealed mainly positive results on a Global Rating Scale and procedure specific rating scale.
Conclusions: Contemporary evidence shows that performance metrics within endovascular simulations improve with simulation training. Successful translation to *in vivo* situations is observed in patient specific procedure rehearsals and RCTs on real procedures. However, there is no level I evidence to show that predictive validity of simulation can definitively improve patient outcomes. Current literature supports the idea that there is a beneficial role of simulation in endovascular training. Future studies are needed to confirm the efficacy of simulation in endovascular surgical training and to see if simulation is superior to traditional training in the operating theatre.

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Keywords: Endovascular procedures, Rating scale, Simulation, Simulator, Training, Virtual reality

Does video gaming affect endovascular skills?

Simulation-based endovascular skills assessment: The future of credentialing?

Jimmy J. Pak, MD, E. John Harris Jr, MD, Thomas M. Krummel, MD,
nd Jason T. Lee, MD, *Stanford, Calif*

ndovascular skills training measurably improves performance in catheter-based image-
rpose of this study was to determine whether structured global performance assessment
n correlated well with trainee-reported procedural skill and prior experience level.
h-year general surgery residents interviewing for vascular fellowship training provided
g prior open vascular and endovascular operative experience. The pretest questionnaire
e subjects into low (<20 cases) and moderate (20 to 100) endovascular experience groups.
erform a renal angioplasty/stent procedure on the Procedicus Vascular Intervention System
simulator (Mentice Corporation, Gothenburg, Sweden). The subjects' performance was supervised and evaluated by a blinded expert interventionalist using a structured global assessment scale based on angiography setup, target vessel catheterization, and the interventional procedure. Objective measures determined by the simulator were also collected for each subject. A postsimulation questionnaire was administered to determine the subjects' self-assessment of their performance.
Results: Seventeen surgical residents from 15 training programs completed questionnaires before and after the exercise and performed a renal angioplasty/stent procedure on the endovascular simulator. The beginner group (n = 8) reported prior experience of a median of eight endovascular cases (interquartile range [IQR], 6.5-17.8; range, 4-20), and intermediate group (n = 9) had previously completed a median of 42 cases (IQR, 31-44; range, 25-89, $P = .01$). The two groups had similar prior open vascular experience (79 cases vs 75, $P = .60$). The mean score on the structured global assessment scale for the low experience group was 2.68 of 5.0 possible compared with 3.60 for the intermediate group ($P = .03$). Scores for subcategories of the global assessment score for target vessel catheterization ($P = .02$) and the interventional procedure ($P = .05$) contributed more to the differentiation between the two experience groups. Total procedure time, fluoroscopy time, average contrast used, percentage of lesion covered by the stent, placement accuracy, residual stenosis rates, and number of cine loops utilized were similar between the two groups ($P > .05$).
Conclusion: Structured endovascular skills assessment correlates well with prior procedural experience within a high-fidelity simulation environment. In addition to improving endovascular training, simulators may prove useful in determining procedural competency and credentialing standards for endovascular surgeons. (J Vasc Surg 2008;47:1008-14.)

See, EJVES, 2016

Tedesco, JVS, 2008

Endovascular Skills

Trainees exchange & Leading Centers

Other Specialties

Other Centers

Other Countries

J Cardiovasc Surg (Torino). 2011 Feb;52(1):57-62.

Training of vascular surgeons by interventional radiologists.

Cefali P[1], Rosso R, Van Den Berg JC.

Author informati

Abstract

This paper will discus
Prerequisites and adv
developing multidisci

J Cardiovasc Surg (Torino). 2011 Feb;52(1):53-6.

The role of leading centers for endovascular surgery in education and training for endovascular treatment of peripheral vascular disease.

Krajcer Z[1], Ghosheh B.

Author information

Abstract

The field of peripheral vascular disease (PVD) management is ra
techniques frequently involve hybrid approaches for treating com
techniques present new challenges for physicians who care for p
understand the disease entity, but the knowledge, expertise in an
employed. To enable physicians to meet these requirements for e
credentialed to perform them, specific training requirements must
based review discussing the development of interventional vascu
techniques.

PMID: 21224810

[PubMed - indexed for MEDLINE]

J Cardiovasc Surg (Torino). 2011 Feb;52(1):39-46.

Importance of exchange of vascular trainees among centers.

Bosiers M[1], Moreels N, Callaert J, Deloose K.

Author information

Abstract

Training in surgery has for a long time been based on the classical model of master-apprentice, leading to the creation of "schools" comparable to the famous painter schools of Rubens, Rembrandt and many others during the Middle Ages. Although it may offer some advantages, this model is no longer suitable today. Modern vascular surgery covers several fields, including not only open vascular and endovascular treatment, but also non-invasive diagnosis and medical treatment of vascular diseases in different parts of the human body. However, the goal of training remains the formation of a "holistic vascular surgeon", with knowledge of and experience in all these areas. As most training centers are more focused on and have more expertise in one or some of these areas, an ideal training curriculum would consist of a rotation between different centers with different points of attention and possibly even rotations in other specialties, such as interventional radiology, vascular medicine or ultrasonography. Such an exchange cannot only be beneficial for the trainee but contact with trainees with a different background can also offer an added value to the training center. Thanks to new ways of communication and transportation, exchange of trainees, even in different countries, has become much easier. Nevertheless, a problem often arises concerning the requirements for training as, despite the many efforts already undertaken, it still differs significantly between different countries. The development of a core-curriculum and mutual recognition of training centers is urgently needed and further steps in the harmonization of training programs and requirements need to be stimulated.

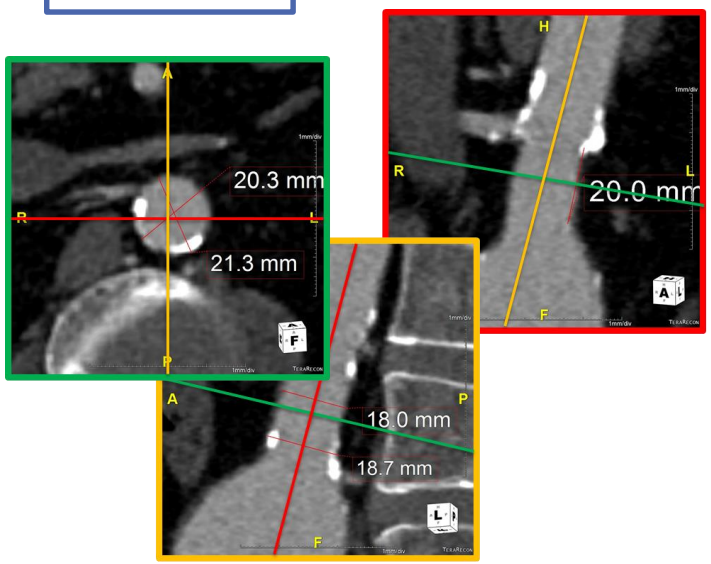
Procedure Planning & Imaging Support

Workstation & Image Analysis

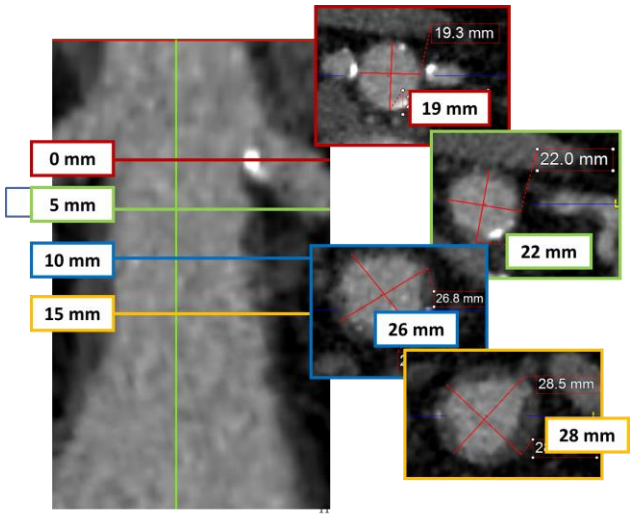
CTA **MRA**

Use image reconstruction

MPR



CPR

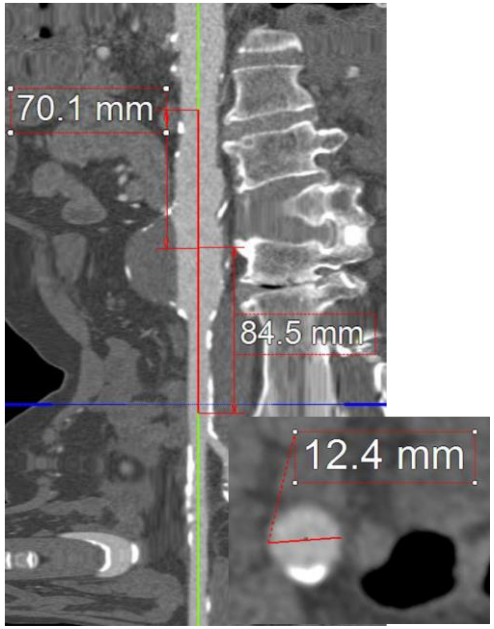


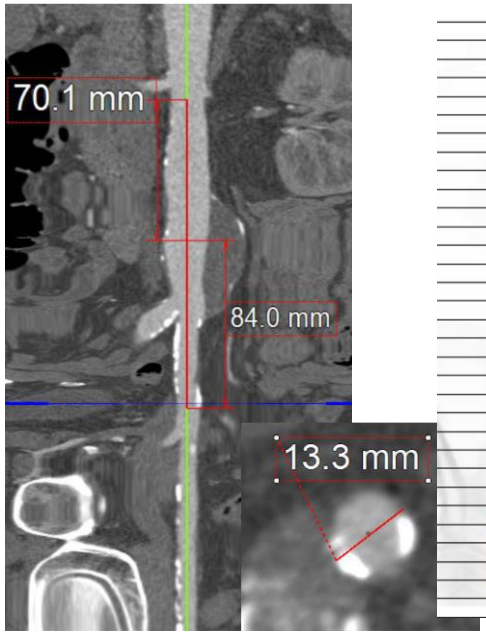
3D

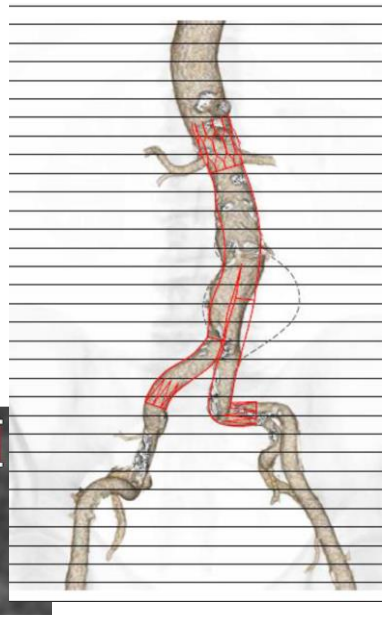
Procedure Planning & Imaging Support

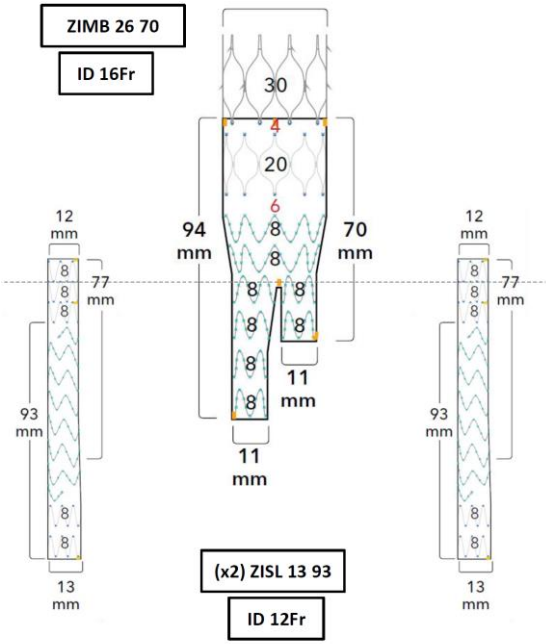
Workstation & Image Analysis

Sizing







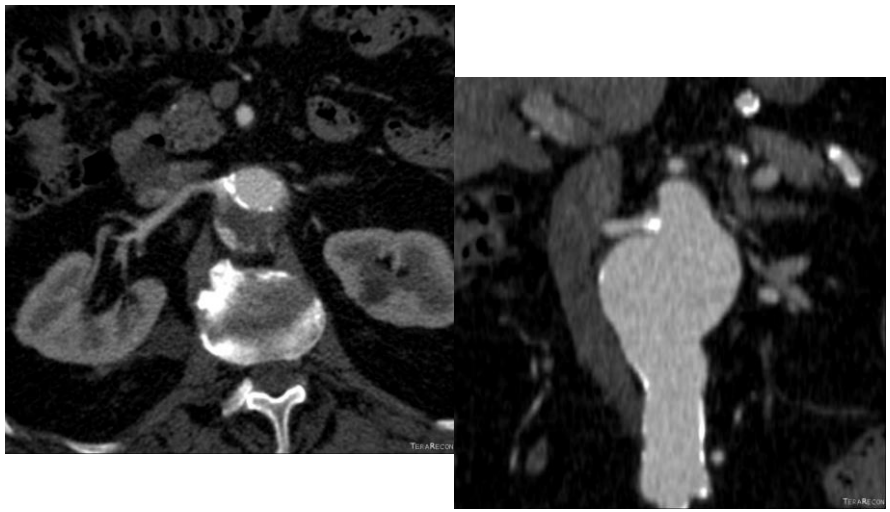


Procedure Planning & Imaging Support

Workstation & Image Analysis

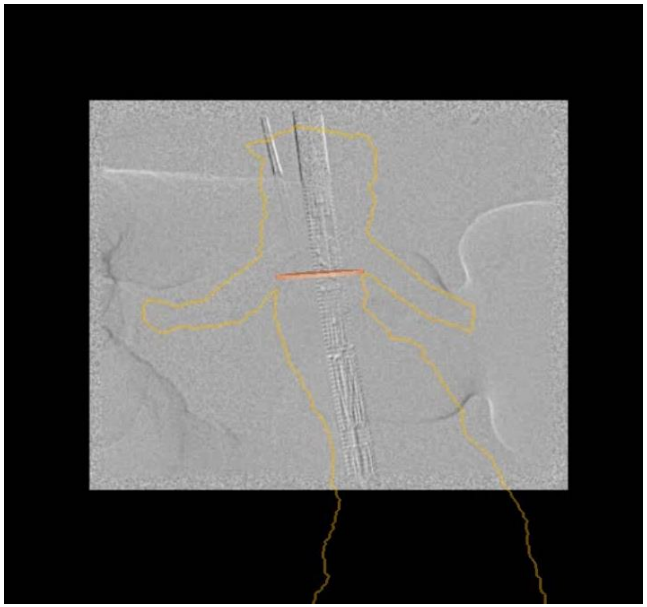
Step by step Planning

Spot difficulties

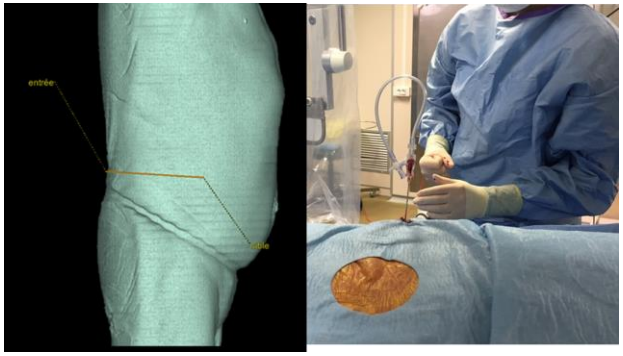


Procedure Planning & Imaging Support

Advanced Imaging Application



Fusion



Needle Trajectory

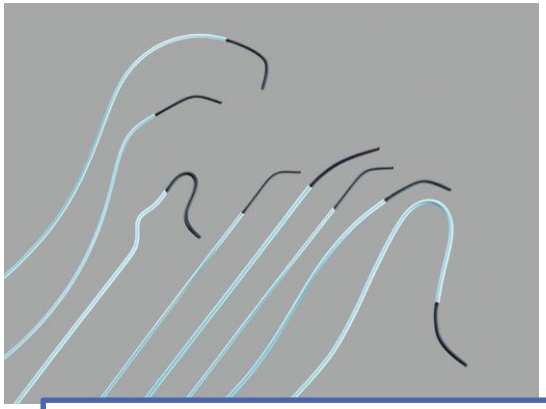
Ultrasound

Procedure Planning & Imaging Support

Device Knowledge

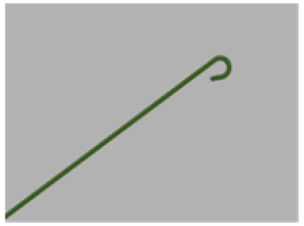
Anticipate device behaviour

Which catheter for…



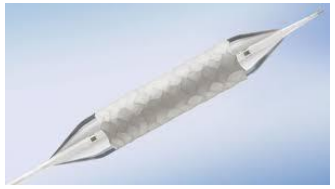
Renal artery or Controlateral limb catheterization?
Guidewire change?
Etc…

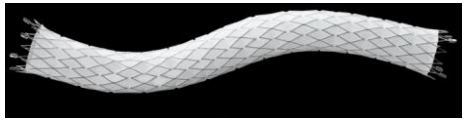
Do I need a guidewire with…



Good navigability?
Strong support?
Floppy tip?

Which bridging stent is the best for…





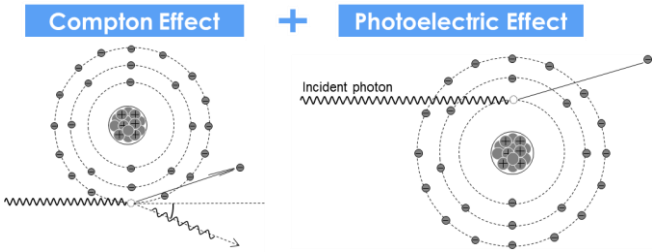
A fenestration?
A branch?

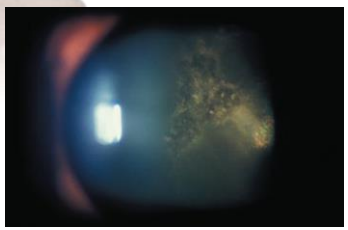
Radiation protection

Gain awareness

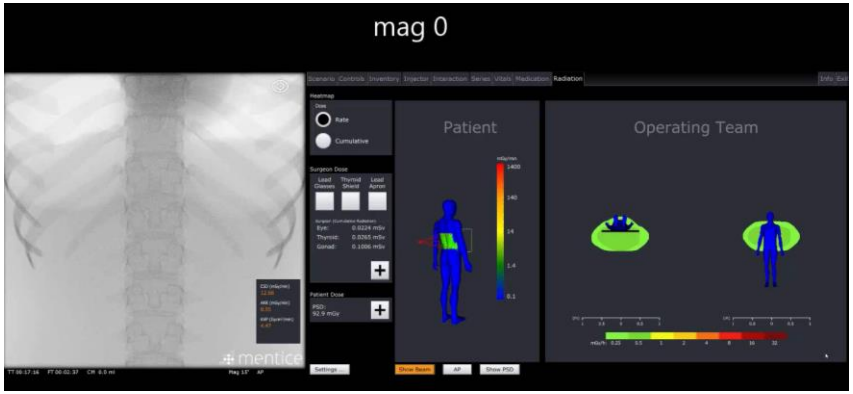
X-Rays have no taste, no smell, no colour…

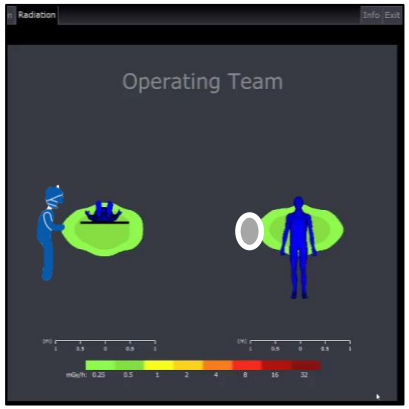
Learn about the risk





Basic Knowledge on X-Ray physics



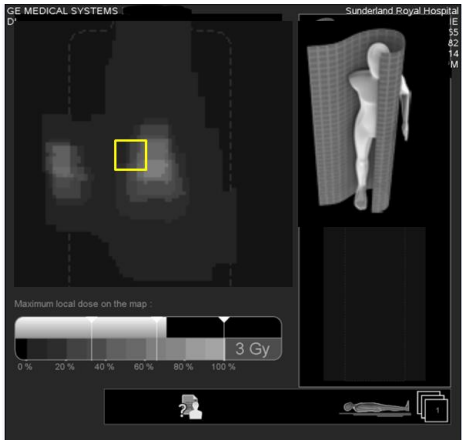


Radiation protection

Gain awareness

Real-Time Active Dosimeters

Skin Dose Monitoring



DACS

Literature Review

Radiation protection

Follow ALARA principles

Use Low Dose Mode

Normal — 100 %

Low — 50 %

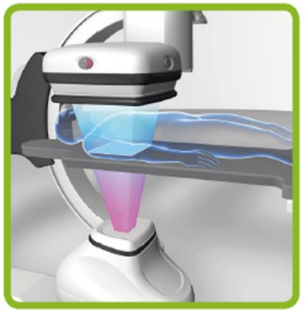
Work in Pulsed Mode

Continuous Mode

Pulsed Mode

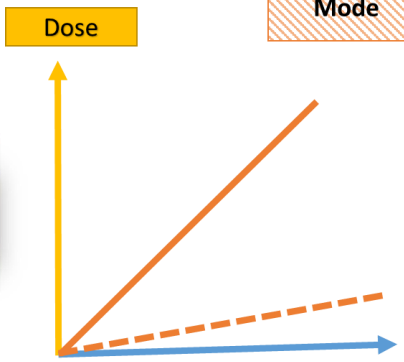
Optimize system Geometry

Low Detector / **High** Table



Air Kerma at patient skin

Tableside controls



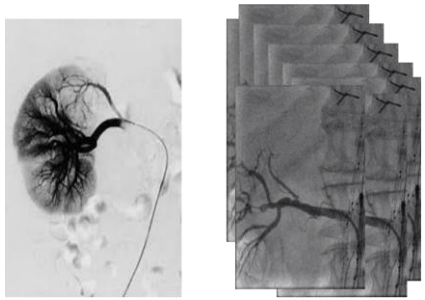
Frame rates

Lowering frame rates by half allows you to reduce the dose rate by up to ~50%
→ Always use lowest acceptable frame rates

Radiation protection

Follow ALARA principles

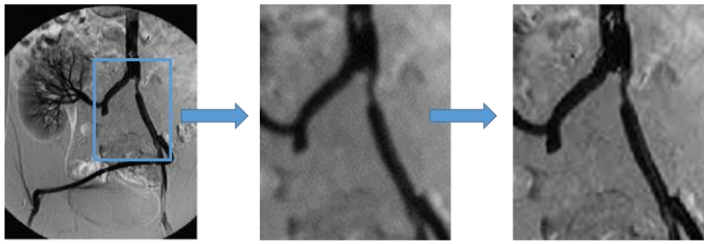
Avoid DSA runs



1 DSA image ~ 500 fluoro images

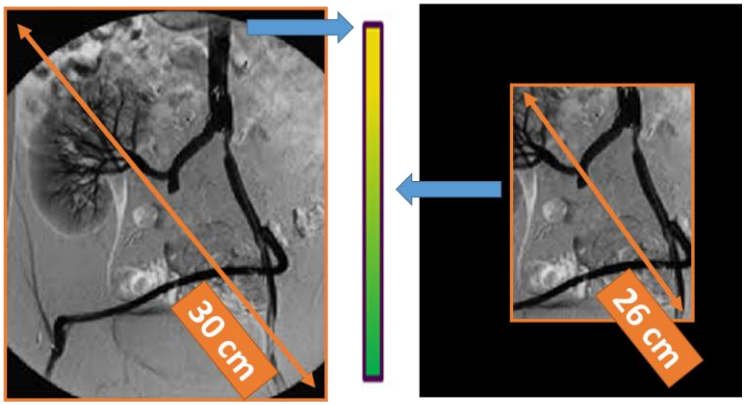
Avoid Magnification

Maintain Image Quality

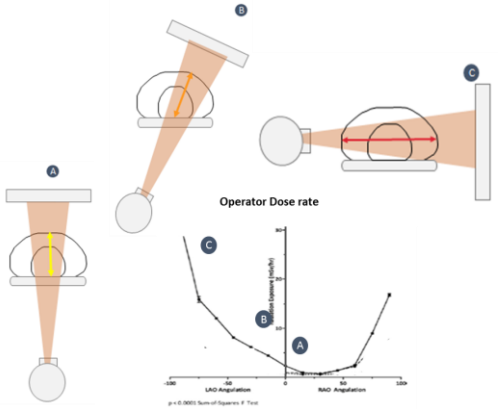


Resolution loss **Increases Dose**

Use Collimation

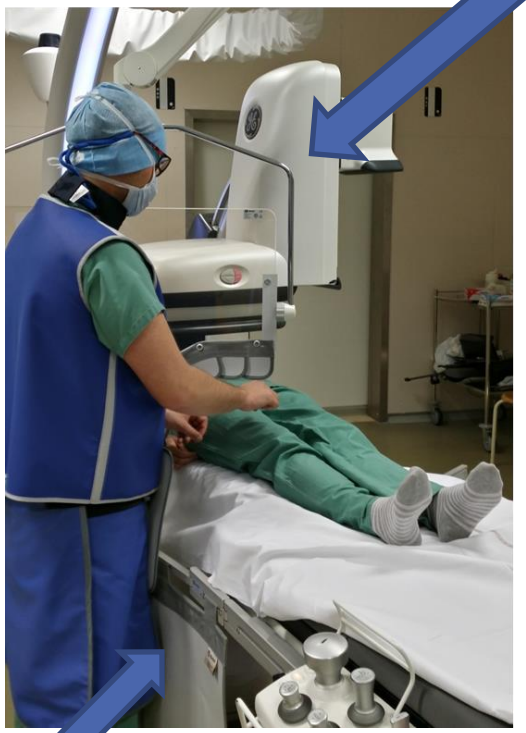


Avoid extreme angulations



Radiation protection

Use Shielding



Step Back

Use long sheaths

Take Home Message

Endo: more than half our practice

« Imaging Skills » on top of « Endo/Surgical Skills »

Radiation protection should not be forgotten

Aortic Endovascular Education

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