Learn EVAR sizing from scratch in 6 hours:

The results of a one-day intensive course in EVAR sizing and stent graft selection for vascular trainees.

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Introduction

Endovascular aortic repair (EVAR) is an expert task and structured training at residency level is limited. Validated assessment tools of competence in both EVAR sizing and procedural competence have recently been published.[1–3] How vascular trainees can achieve sufficient skills in EVAR sizing and graft selection following a predefined curriculum and workshop format is sparsely explored.

Aim

To investigate the effect of a 6h workshop in basic sizing and stent graft selection on vascular surgery trainees without prior EVAR experience.

Methods

A 6h workshop in sizing and stent graft selection was planned as part of a five-day hands-on simulation-based course in EVAR and open aortic repair (“The aortic course”). The sizing workshop was conducted in four small teams with a trainee to trainer ratio of 2:1. Sixteen vascular surgery trainees with limited endovascular experience from Denmark, Sweden, and Norway were included. Participants received pre-course learning materials including sizing instructions. After a one-hour instructional lecture, participants individually did five hours of supervised training in aortic sizing on dedicated imaging workstations (3mensio, Maastricht, The Netherlands) and selected modular stent grafts from the COOK Zenith product line (COOK Medical, Bloomington, Indiana, USA) on increasingly challenging cases.

Finally, the participants were tested (figure 1) using a previously validated assessment tool of EVAR sizing and graft selection (figure 2) and the test scores were compared to experts in the field.[1]

Results

After the workshop, all participants could size the test-case and select a stent graft combination unaided in 24:35 (13:30 - 48:20) minutes (median and range). The participants’ test scores were in median 14.0 (11.7-25.2) (lower is better) which were identical to experienced EVAR operators (<200 performed EVARS as lead operator) (p = .32) but significantly inferior to the standard defined by genuine EVAR experts (≥200 performed EVARs) (p= .01) (figure 3).[1]

The participants chose mainbody grafts with a diameter of 24 (22-30) mm (mode and range) and length of 108 (96-118) mm, whereas the experts had chosen a diameter of 24 (24-30) mm and a length of 96 (96-111) mm. Larger variations were seen in choice of extension limbs on both ipsilateral 93 (59-135) mm and contralateral side 87 (74-152) mm. The experts had chosen 56 (56-90) mm ipsilateral and 90 (90-107) mm contralateral. When it comes to anatomical measurements, no significant differences were found on individual diameter or length measurements between the participants and the two reference groups.

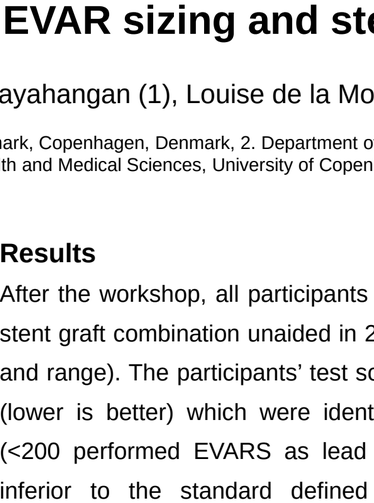

Figure 1. The test case

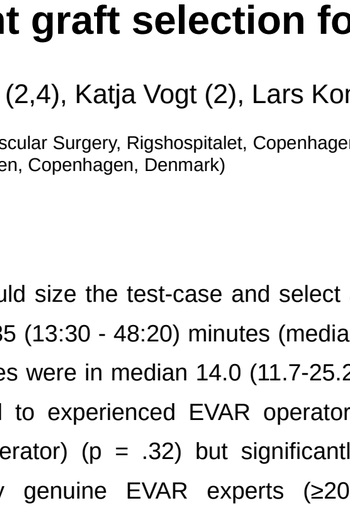

Figure 2. The test sizing chart

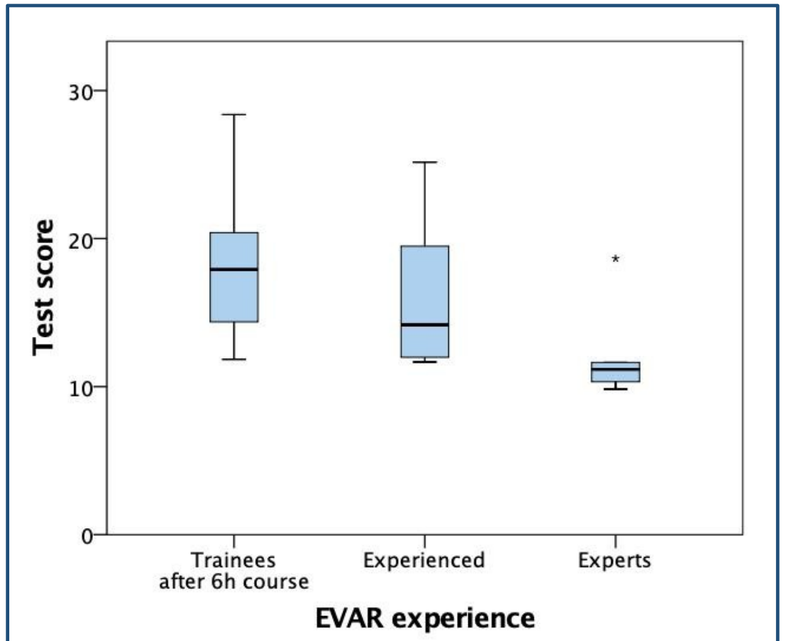

Figure 3. Distribution of test scores (lower is better)

Conclusion

This study presents evidence of the effect of a standardised one day intensive EVAR sizing and graft selection workshop aimed at residency level. The results showed that vascular trainees with no prior EVAR knowledge learned to size and select stent grafts on par with experienced EVAR operators on the test case. The results suggest that sizing the anatomy is fairly accessible but stent graft selection can be challenging which is in concordance with previous research.[1]

1 Strøm M, Lönn L, Bech B, Schroeder TV, Konge L. Assessment of Competence in EVAR Stent Graft Sizing and Selection. Eur J Vasc Endovasc Surg 2017;53(6):844–52.
2 Strøm M, Lönn L, Bech B, Schroeder TV, Konge L, Aho P, et al. Assessment of Competence in EVAR Procedures: A Novel Rating Scale Developed by the Delphi Technique. Eur J Vasc Endovasc Surg 2017;54(1):34–41.
3 Strøm M, Lönn L, Konge L, Schroeder T V., Lindgren H, Nyheim T, et al. Assessment of EVAR Competence: Validity of a Novel Rating Scale (EVARATE) in a Simulated Setting. Eur J Vasc Endovasc Surg 2018:1–8.

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REGION H

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Objective and predictive analysis of anastomoses as an educational and benchmarking tool.

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WHY?

More than 2.5 M vascular anastomosis are performed annularly, however information is limited about the quality and predicted outcomes of these. Development of associated skills are based on empiritical observations.

Hands-on-trainings, courses gives only subjective and irrespective data about performance an potential clinical impact.

HOW?

A method has been developed which enables the comparative observation result of surgical-technical performance. The predicted clinical results are continously presented to participants.

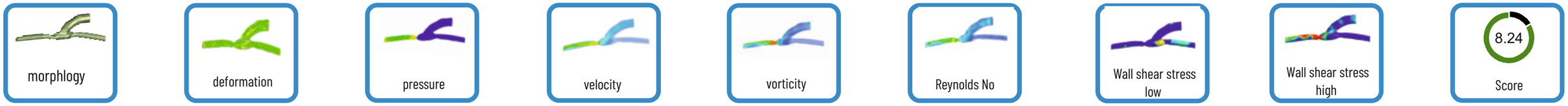
A prospective randomized study was carried out for measuring the effectivity of the feedback-based educational method compared to conventional course / hand-on-training setting.*

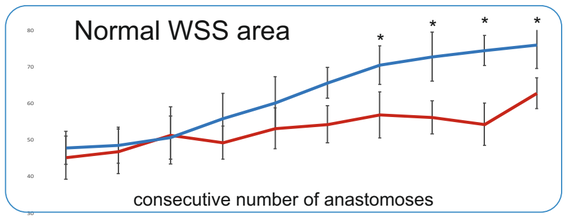
WHAT?

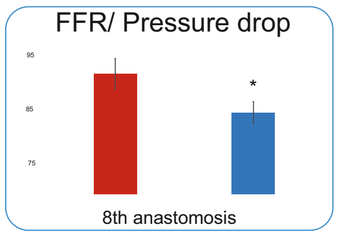
Assessment of anastomosis quality is performed based on high - resolution, 3D reconstruction of the vessels lumen.

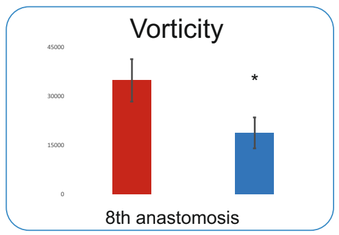
Computational simulation (CFD) was perfored, using physiological parameters on the boundaries.
The following parameters were determined: velocity, pressure, vorticity, helicity, wall shear stress, oscillating shear index, overal score.

RESULTS









Conventional group- educated conventionally with supervisor's suggestios

Study group- morphological and functional assessment was demonstrated consecutivelly

*Both groups contained 10 students and 5 residents and 10 anastomoses were performed consecutivelly.

CONCLUSION

Analysis of blood flow and morphology lead to quicker and more effective improvement of results in vascular anastomoses.

It is supposed that the educational methodology has effective impact on end-results of surgical procedures.

The method is presumed to be effective for benchmarking and data-aquisition of anastomoses function

One Step at a Time – Improving Surgical Teaching and Training

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Introduction

As **junior doctors spend less time in the operating theatre** due to increased workload and safer roster requirements, creating a supportive learning environment that provides **additional procedural and mental training** is a key characteristic of modern surgical training. We aimed to understand what draws doctors to a surgical career, and to **identify cost effective surgical training concepts**. We then wanted to assess whether similar strategies could be implemented in our own hospital.

identify – analyse – establish – evaluate

Methods

Phase 1 (**identify**) – What makes people (*not*) choose a surgical career? Which additional training concepts exist? (literature review)

Phase 2 (**analyse**) – Which concepts could easily be adapted and are not resource intense?

Phase 3 (**establish**) – Plan and conduct sessions locally.

Phase 4 (**evaluate**) – Consider feedback and effectiveness (surveys, reflection, informal feedback)

Results

We identified the following aspects influencing a surgical career choice:

\+ friendly team attitude, good surgical role models, active involvement in operations

– bullying, long working hours, harassment, lack of learning opportunities

We identified the following additional training concepts as potentially beneficial for our institution. Most of the concepts identified have been successfully established in our institution during the current training year.

- ✓ In hospital Bowel Anastomosis Course
- ✓ In hospital Laparoscopy Course
- ✓ In hospital Vascular Suturing Course
- ✓ Basic suturing course for House Officers
- ✓ Virtual Reality Learning
- ✓ Women in Surgery Networking Forum
- ✓ Live Anatomy Demonstrations/Bootcamp
- ✓ Direct Mentoring
- ✓ Surgical Case Simulations

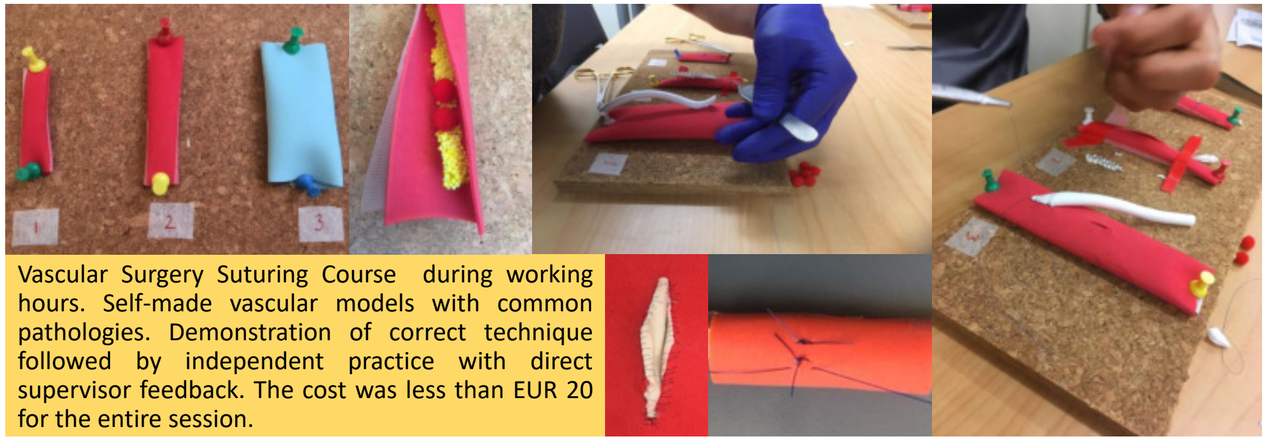
The teaching sessions were beneficial for a great range of participants. For example, our Women in Surgery Event was attended by Medical Students (31.8%) , Residents (36.4%), and Senior Medical Staff (13.6%). Most of the participants rated the event as “highly recommended” (81.8%).

An in hospital laparoscopy and “wet lab” bowel anastomosis course for surgical residents, basic suturing course for first year doctors, and Women in Surgery Networking Event were all implemented during the last 10 months – free of charge.

Discussion

Evidence in the literature **is patchy** and focused on students rather than junior doctors. Effects described in students need to be evaluated in junior doctors. While we identified several modern surgical teaching concepts, publication bias might have prevented us from assessing the full spectrum of options. We focused on concepts that required minimal resources. However, these might not necessarily be the most effective learning concepts. Focus on cost effectiveness relied material and instrument supply by companies.

While we attempted to collect standardized feedback from participants, we acknowledge that there is a risk that the feedback was overly positive as the participants were personally known to us. **Formal evaluation** with before/after assessments and semi structured interviews is needed to determine which of these teaching concepts actually improve the performance of surgical trainees and increase their job satisfaction.



Vascular Surgery Suturing Course during working hours. Self-made vascular models with common pathologies. Demonstration of correct technique followed by independent practice with direct supervisor feedback. The cost was less than EUR 20 for the entire session.

Conclusions

- **Modern surgical teaching concepts complement traditional hands-on training**
- We successfully implemented additional teachings into daily practice
- We encourage **real-life evaluation** of similar learning concepts in **YOUR hospital** environment.

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