Assessment of competence in EVAR procedures – A novel rating scale using Delphi technique

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Disclosure

Speaker name: Lars Lönn (Loenn)

I have the following potential conflicts of interest to report:

www.mentice.com

Stocks: Le Maitre
Apprenticeship learning
Courses (industry based/society based)
No test for competency exists
Proficiency has been determined by caseload or the opinion of a supervisor

https://www.theabr.org/interventional-radiology
Competency based learning

Competency based learning focuses on the achievement of specific skills benchmarked by predetermined standards.
Mastery learning is a structured approach to competency-based learning.

Trainees follow an educational program based on clearly predefined proficiency standards that the trainee must pass to advance to higher levels of training.
Assessment of clinical competence

Miller’s pyramid

- Knows
- Knows how
- Shows how
- Does
Assessment of clinical competence

Miller’s pyramid
Validity of an assessment is the accuracy of how well the assessment corresponds to the test subject.

Evidence of validity is the body of research presented to support or refute the interpretation of assessment data.
Framework for validity

Messicks unitary framework for validity

1. Content
2. Response process
3. Internal structure
4. Relationship to other variables
5. Consequence of testing

Samuel J. Messick
Assessment of competence in EVAR procedures –
A novel rating scale developed by the Delphi technique

Aim:

To develop a procedure specific assessment tool, EVARATE, for EVAR operator’s procedural competence.
Assessment of competence in EVAR procedures – A novel rating scale developed by the Delphi technique

Rating scales

Checklists

Global Rating Scales
Assessment of competence in EVAR procedures – A novel rating scale developed by the Delphi technique

Delphi

– An iterative blinded consensus formation process
– Harnesses the combined intelligence of an expert panel
– Developed in the fifties by RAND
Assessment of competence in EVAR procedures –
A novel rating scale developed by the Delphi technique

Delphi

– An iterative blinded consensus formation process
– Harnesses the combined intelligence of an expert panel
– Increasingly used in medical education
Assessment of competence in EVAR procedures – A novel rating scale developed by the Delphi technique
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• Prerequisites for a Delphi study
  – Determine content for first round
  – Determine the expert panel
  – Determine criterion for consensus
Assessment of competence in EVAR procedures – A novel rating scale developed by the Delphi technique

- **Review of literature**
  - Scoping review of existing literature
    - 852 publication
      - 20 fulfilled the inclusion criterion
      - 163 previously validates assessment items
  - IFU reviewed until saturation
    - 4 IFU

- **Interviews with experts (n=3)**
  - Structured interviews
  - Method of data saturation
    - 76 GRS
    - 67 Checklist items
**Assessment of competence in EVAR procedures – A novel rating scale developed by the Delphi technique**

<table>
<thead>
<tr>
<th>Delphi panel members</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Years as specialist (mean, range)</td>
<td>16 (5-30)</td>
</tr>
<tr>
<td>Male</td>
<td>29 (91%)</td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
</tr>
<tr>
<td>Radiology</td>
<td>11 (34%)</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>21 (66%)</td>
</tr>
<tr>
<td>No. of EVAR procedures</td>
<td></td>
</tr>
<tr>
<td>200-399:</td>
<td>18</td>
</tr>
<tr>
<td>400-999:</td>
<td>10</td>
</tr>
<tr>
<td>1000-3000:</td>
<td>4</td>
</tr>
<tr>
<td>Country:</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>2</td>
</tr>
<tr>
<td>Denmark</td>
<td>4</td>
</tr>
<tr>
<td>Finland</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1</td>
</tr>
<tr>
<td>Norway</td>
<td>1</td>
</tr>
<tr>
<td>Sweden</td>
<td>13</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3</td>
</tr>
<tr>
<td>USA</td>
<td>3</td>
</tr>
</tbody>
</table>
Expert interviews
No. Experts = 3
76 GRS
67 Check list items

Qualitative analysis
Merging, reduction and rephrasing of items as GRS

Literature review
4 IFU
20 papers
126 GRS
37 Check list items
Literature review
- 4 IFU
- 20 papers
- 126 GRS
- 37 Check list items

Expert interviews
- No. Experts = 3
- 76 GRS
- 67 Check list items
- Identification of participants
  - n = 35

Qualitative analysis
- Merging, reduction and rephrasing of items as GRS

Delphi round 1
- 83 items
  - n = 32 physicians

Identification of participants
- n = 35

Literature review
- 4 IFU
- 20 papers
- 126 GRS
- 37 Check list items
Literature review
4 IFU
20 papers
126 GRS
37 Check list items

Expert interviews
No. Experts = 3
76 GRS
67 Check list items

Identification of participants
n = 35

Qualitative analysis
Merging, reduction and rephrasing of items as GRS

Delphi round 1
83 items
n = 32 physicians

5 items added by the panel
18 redundant items reduced to 3

44 items eliminated

Delphi round 2
29 Items
n = 32 physicians

Identification of participants
n = 35
Expert interviews
No. Experts = 3
76 GRS
67 Check list items

Identification of participants
n = 35

Identification of participants
n = 35

5 items added by the panel
18 redundant items reduced to 3

Qualitative analysis
Merging, reduction and rephrasing of items as GRS

Delphi round 1
83 items
n = 32 physicians

Delphi round 2
29 Items
n = 32 physicians

Delphi round 3
14 Items
n = 29 physicians

44 items eliminated

15 items eliminated

Literature review
4 IFU
20 papers
126 GRS
37 Check list items

Identification of participants
n = 35

5 items added by the panel
18 redundant items reduced to 3
Literature review
4 IFU
20 papers
126 GRS
37 Check list items

Expert interviews
No. Experts = 3
76 GRS
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Identification of participants
n = 35

5 items added by the panel
18 redundant items reduced to 3

Qualitative analysis
Merging, reduction and rephrasing of items as GRS

Delphi round 1
83 items
n = 32 physicians

44 items eliminated

Delphi round 2
29 Items
n = 32 physicians

15 items eliminated

Delphi round 3
14 items
n = 29 physicians

7 Items eliminated

EVARATE
7 items
### EndoVascular Aortic Repair Assessment of Technical Expertise – EVARATE

<table>
<thead>
<tr>
<th>Study</th>
<th>ID number:</th>
<th>Date:</th>
<th>Assessor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Respect for the puncture sites and the access vessel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Introduces and advances delivery devices with unacceptable force. Does not secure the sheaths when exchanging instruments or the sheaths travels.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Introduces and advances delivery devices with acceptable care and force. Secures the sheaths when exchanging instruments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Introduces and advances delivery devices with optimal care. Keeps sheaths in place at all times.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Demonstrates ability to accurately and safely deploy the top-stent of the stent graft system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Deploys top-stent at clearly wrong place, wrong orientation or unsafe.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Deploys the top-stent safely in acceptable position and orientation. Some time consuming.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Deploys the top-stent safely and accurately in optimal position and orientation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Demonstrates ability to release the main graft securely and accurately</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Displaces or rotates the graft while releasing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Releases the main graft securely, and securely in acceptable position and orientation using adequate effort.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Confidently releases the main graft securely and accurately in optimal position and orientation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Demonstrates optimal fluoroscopy view when releasing the main graft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Poor visualization of the proximal sealing zone. Does not correct for parallax. Does not have retails, bifurcation, or contra-leg tick-marks in the image.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Acceptable visualization of the proximal sealing zone. Projects renal and corrects for parallax. Has contra-contralateral-leg tick-marks and the aortic bifurcation in the image.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Superior and fluently visualization of the proximal sealing zone with optimal projection of both renal and optimal correction for parallax. Image centered and magnified on renals and tick-marks on the contralateral-leg and the aortic bifurcation in the image.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Catheterization of the contralateral limb of the main graft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Cannot cannulate and/or does not ensure the right lumen in the main body.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Ensures the entry-side/gate in two projections upon catheterization and ensures the right lumen in the main body with pigtail. Secures safe placement of a stiff wire. Some time consuming.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Cannulates confidently. Ensures the entry-side/gate in two projections upon catheterization and ensures the right lumen in the main body with pigtail. Secures safe placement of a stiff wire with superior technique.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Demonstrates ability to deploy the extension limbs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Covers one or both iliac arteries and/or extension limbs without correction. Poor visualization. Awkward movements and/or time consuming.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Able to perform and analyse a completion angiogram</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Insufficient visualization of renal and visceral arteries, proximal and distal sealing zones, overlapping stent grafts, and insufficient check for endolesk.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>Acceptable visualization of renal and visceral arteries, proximal and distal sealing zones, overlapping stent grafts, and acceptable check for endoleaks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>Superior visualization of renal and visceral arteries, proximal and distal sealing zones, overlapping stent grafts, and superior check for endoleaks.</td>
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<td></td>
</tr>
</tbody>
</table>

**Proper time:**  Total score:

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### Assessment of Competence in EVAR Procedures: A Novel Rating Scale Developed by the Delphi Technique

**M. Strom***, L. Lønnd, B. Bech, L. V. Schroeder, L. Konge, on behalf of the “EVARATE Delphi Panel”

- Copenhagen Academy for Medical Education and Simulation, The Capital Region of Denmark, Rigshospitalet, Copenhagen, Denmark
- Department of Vascular Surgery, Rigshospitalet, Copenhagen, Denmark
- University of Copenhagen, Copenhagen, Denmark
- Department of Radiology, Rigshospitalet, Copenhagen, Denmark

**WHAT THIS PAPER ADDS**

This paper presents the first procedure specific tool for assessing competence in endovascular aortic repair. A Delphi approach was used to achieve expert consensus. A panel of 32 international experts (median 300 EVAR procedures, range 200–3000) from vascular surgery (n = 21) and radiology (n = 11) was established. The first Delphi round was based on a review of endovascular skills assessment papers, stent graft instructions for use, and structured interviews. It led to a primary pool of 83 items that were formulated as global rating scale items with tentative anchors. Iterative Delphi rounds were executed. The panelists rated the importance of each item on a 5-point Likert scale. Consensus was defined as 80% of the panel rating an item 4 or 5 in the primary round and 90% in subsequent rounds. Consensus on the final tool definition was achieved when Cronbach’s alpha > .8 after a minimum of three rounds.

**Methods:** Thirty-two of 35 invited experts participated. Three rounds of surveys were completed with a completion rate of 100% in the first two rounds and 91% in round three. The 83 primary assessment items were supplemented with five items suggested by the panel and reduced to seven pivotal assessment items that reached consensus, Cronbach’s alpha = 0.82. The seven item rating scale covers key elements of competence in EVAR stent deployment and deployment. Each item has well defined grades with explicit anchors at unacceptable, acceptable, and superior performance on a 5 point Likert scale.

**Conclusion:** The Delphi methodology allowed for international consensus on a new procedure specific global rating scale for assessment of competence in EVAR. The resulting scale, EndoVascular Aortic Repair Assessment of Technical Expertise (EVARATE), represents key elements in the procedure. EVARATE constitutes an assessment tool for providing structured feedback to endovascular operators in training.

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**Keywords:** Abdominal aortic aneurysm, Clinical competence, Delphi technique, Educational assessment, Endovascular procedures, EVAR

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**INTRODUCTION**

Endovascular aortic repair (EVAR) aims to exclude an abdominal aortic aneurysm (AAA) by implanting a modular stent graft system in the aorta. This involves several more or less complex procedural steps reflected in a shallow learning curve and outcome depending on operator experience. 1-3 Competency based education aims to ensure that the required skills in relation to an objectified standard are met. 4,5 The emphasis is to demonstrate skilful application of knowledge. 6-7 Trainees learn at different paces and a certain number of procedures do not ensure competency. 8 Evaluation of skills should be performed with reliable assessment tools and structured feedback to increase learning and performance of trainees. 9-10 Several assessment tools have been developed for task specific endovascular procedures. 11-20 However, these must be domain specific with regard to anatomy and
Assessment of procedural EVAR competence: validity of a novel rating scale (EVARATE) in a simulated setting.