A comparison of the knowledge base and surgical skills of integrated versus independent surgery trainees

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Background

- Training paradigms
  - 47 integrated 0/5 vascular surgery residencies (IR)
  - 106 independent 5/2 vascular surgery fellowships (IF)

- Next accreditation system
  - Shifts focus of residency review to outcomes measurements
  - Milestones established
  - Specialty specific training targets residents are expected to accomplish during their education
    - Medical management of vascular disease and its risk factors
    - Care of critically ill patient
    - Non-invasive and invasive diagnostic imaging
    - Endovascular and open surgical skills

Objective

- To compare the knowledge base and surgical skills of IR and IF trainees using vascular surgery milestones

Hypothesis

- IR trainees would be superior in knowledge base while IF trainees would be superior in surgical skills

Nothing to disclose
Methods

- In September 2014, a survey, endorsed by the Association of Program Directors in Vascular Surgery (APDVS) was sent to all program directors (PDs) of IR and IF training programs.
- PDs were asked to evaluate their post graduate year (PGY) 4-7 trainees at the end of 2013-14 academic year:
  - Rate ten of their trainees milestones pertinent to knowledge base and surgical skills using a 5-point Likert scale.
  - Choose from above milestones, their trainee's three strongest and weakest milestones.
  - Choose from a list, the factors they felt were contributing most to their trainee's strengths and weaknesses.

Results

- Of 166 surveys sent, 56 (34% response rate) PDs replied.
- Total of 87 trainees evaluated:
  - 12 PGY4
  - 12 PGY5
  - 35 PGY6
  - 28 PGY7

Results

<table>
<thead>
<tr>
<th>Milestone</th>
<th>PGY 4 Mean (N=12)</th>
<th>SD</th>
<th>PGY 6 Mean (N=35)</th>
<th>SD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of patient data</td>
<td>3.75 (0.87)</td>
<td></td>
<td>4.09 (0.51)</td>
<td></td>
<td>0.18</td>
</tr>
<tr>
<td>Knowledge of vascular medicine</td>
<td>3.25 (0.75)</td>
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<td>3.37 (0.73)</td>
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<td>0.68</td>
</tr>
<tr>
<td>Knowledge of vascular imaging</td>
<td>3.25 (0.62)</td>
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<td>3.49 (0.61)</td>
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<td>0.29</td>
</tr>
<tr>
<td>Performance of peri-operative patient care</td>
<td>3.50 (1.00)</td>
<td></td>
<td>3.68 (0.58)</td>
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<td>Knowledge of procedural rationale</td>
<td>3.25 (0.75)</td>
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<td>3.57 (0.56)</td>
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<tr>
<td>Knowledge of procedural anatomy</td>
<td>3.00 (0.85)</td>
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<td>3.51 (0.66)</td>
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<tr>
<td>Demonstration of procedural understanding</td>
<td>3.17 (0.63)</td>
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<td>3.51 (0.54)</td>
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<tr>
<td>Open surgical skills</td>
<td>2.92 (0.79)</td>
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<td>3.34 (0.70)</td>
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<tr>
<td>Endovascular surgical skills</td>
<td>3.08 (0.51)</td>
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<td>3.24 (0.76)</td>
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<tr>
<td>Radiation safety</td>
<td>3.17 (0.72)</td>
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<td>2.97 (0.85)</td>
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<td>0.60</td>
</tr>
</tbody>
</table>
Results

**Milestone** | **PGY 4** | **PGY 6** | **P-value** | **Mean** (N=12) | **SD** | **Mean** (N=28) | **SD**
---|---|---|---|---|---|---|---
Acquisition of patient data | 3.75 | 0.87 | 4.09 | 0.51 | 0.18
Knowledge of vascular medicine | 3.25 | 0.75 | 3.37 | 0.72 | 0.08
Knowledge of vascular imaging | 3.25 | 0.62 | 3.48 | 0.65 | 0.29
Performance of peri-op patient care | 3.30 | 0.90 | 3.69 | 0.58 | 0.65
Knowledge of procedural rationale | 3.25 | 0.75 | 3.57 | 0.64 | 0.18
Knowledge of procedural anatomy | 3.00 | 0.85 | 3.51 | 0.64 | 0.04
Demonstration of procedural understanding | 3.17 | 0.83 | 3.51 | 0.74 | 0.20
Open surgical skills | 2.82 | 0.79 | 3.24 | 0.73 | 0.05
Endovascular surgical skills | 3.08 | 0.51 | 3.34 | 0.86 | 0.37
Radiation safety | 3.27 | 0.72 | 2.87 | 0.85 | 0.00

**Results**

- What do you feel your trainees three strongest milestones are?
  - **PGY4**
    - Open surgical skills (66.67 vs. 20.00 p=0.01)
  - What do you feel are contributing most to these strengths?
    - **PGY4**
      - Not enough time spent in vascular outpatient clinic (30.00% vs. 11.43% p=0.01)
      - Time spent on performing open surgical procedures (58.33% vs. 29.57% p=0.06)
    - **PGY6**
      - No significant findings

- What do you feel your trainees three weakest milestones are?
  - **PGY4**
    - Open surgical skills (66.67 vs. 20.00 p=0.01)
  - What do you feel are contributing most to these weaknesses?
    - **PGY4**
      - Not enough time spent in vascular outpatient clinic (50.00% vs. 11.43% p=0.01)
      - Time spent on performing open surgical procedures (58.33% vs. 29.57% p=0.06)
    - **PGY6**
      - No significant findings

### Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>PGY 5</th>
<th>PGY 7</th>
<th>P-value</th>
<th>Mean (N=12)</th>
<th>SD</th>
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<th>SD</th>
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<tr>
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</table>

### Contributing Factors

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th>Strength (%) ranked</th>
<th>Weakness (%) ranked</th>
<th>PGY 4</th>
<th>PGY 5</th>
<th>PGY 6</th>
<th>P-value</th>
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<tr>
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<td>50.00</td>
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<tr>
<td>Time spent on endovascular procedures</td>
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<td>Time spent on non-invasive vascular procedures</td>
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<td>0.80</td>
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</table>

### Results

- What do you feel your trainees three strongest milestones are?
  - No significant differences
- What do you feel are contributing most to these strengths?
  - **PGY4**
    - Time spent on SICU rotation (33.33% vs. 8.57% p=0.06)
    - Time spent on vascular surgery call (83.33% vs. 42.86% p=0.02)
  - **PGY6**
    - Previous general surgery experience (36.67% vs. 68.57% p=0.003)
Results

Milestone PGY 5 PGY 7 Mean (N=12) Mean (N=28)
Acquisition of patient data 4.08 0.51 4.36 0.68 0.17
Knowledge of vascular medicine 3.33 1.23 6.06 0.54 0.07
Knowledge of vascular imaging 3.75 0.62 8.06 0.69 0.04
Performance of peri-op patient care 3.75 0.74 8.06 0.59 0.06
Knowledge of procedural rationale 3.50 1.08 8.00 0.67 0.36
Knowledge of procedural anatomy 3.33 0.78 3.54 0.51 0.54
Demonstration of procedural understanding 3.83 0.78 3.56 0.51 0.54
Open surgical skills 3.62 0.78 3.82 0.61 0.20
Endovascular surgical skills 3.83 0.83 4.15 0.75 0.24
Radiation safety 3.83 0.83 3.82 0.61 0.20

Results

- What do you feel your trainees three greatest milestones are?
  - PGY5
    - Open surgical skills (58.33% vs. 10.71% p=0.003)
  - PGY7
    - Previous general surgery experience (8.33% vs. 64.29% p=0.002)
- What do you feel are contributing most to these strengths?
  - PGY5
    - Not enough time in non-invasive vascular laboratory (25.00 vs. 0 p=0.02)
  - PGY7
    - No significant findings
- What do you feel your trainees three weakest milestones are?
  - PGY5
    - Open surgical skills (58.33% vs. 10.71% p=0.003)
  - PGY7
    - No significant findings

Results

- What do you feel are contributing most to these weaknesses?
  - PGY5
    - Not enough time spent performing open surgical procedures (58.33% vs. 7.14% p=0.01)
  - PGY7
    - No significant findings

Results

- What do you feel are contributing most to these weaknesses?
  - PGY5
    - Not enough time spent performing open surgical procedures (58.33% vs. 7.14% p=0.01)
  - PGY7
    - No significant findings

Results

- What do you feel are contributing most to these weaknesses?
  - PGY5
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Results

- What do you feel are contributing most to these weaknesses?
  - PGY5
    - Not enough time spent performing open surgical procedures (58.33% vs. 7.14% p=0.01)
  - PGY7
    - No significant findings

Limitations

- Small cohort
  - IR PGY 4 and 5 slots not filled yet
  - IF PGY 6 and 7 slots being phased out
- Inherent bias of PDs, likely having favoritism for one training paradigm over another
Conclusion

• Though both IR and IF trainees reach all of their vascular surgery milestones by graduation, there was a notable trend that IR trainees are consistently lower than IF trainees particularly in
  – Knowledge of procedural anatomy
  – Open surgical skills

• For IR trainees, PDs should consider increasing time on
  – General surgery rotations and adding case minimum requirements
  – Performing open over endovascular procedures
  – Alternative educational models