Generation of high performance teams in emergency aortic surgery: Simulated leadership and team training is effective in improving the outcomes and safety of procedures

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Disclosure

Speaker name: Colin Bicknell

I have the following potential conflicts of interest to report:

☑ Consulting – Medtronic, Bolton Medical, Orzone
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☑ Other(s) – Speaker, travel and conference fees from Medtronic and Bolton and Gore;
Imperial College London:
☑ Institutional level funding from Orzone
Studies of the 2000 European Cup demonstrate that the final rankings in tournaments can be predicted by analysing offensive and defensive error during each of the 31 matches.
“The principle comes from the idea that if you break down everything you can think of that goes into riding a bike and then improve it by 1% you will get a significant increase when you put them all together”

Dave Brailsford, UK cycling performance director
PHASE 1: STUDY INTRODUCED AT EACH SITE

≈5 cases per team
Training
Observer and team reporting

PHASE 2: DATA COLLECTION

≈10 aortic cases per team
Teams self-report error using error capture tool

Design and Validation of an Error Capture Tool for Quality Evaluation in the Vascular and Endovascular Surgical Theatre

S.L. Mason a, S. Kuruvilla a, C.W. Riga a,b, M.S. Gohel a,b, M. Hamady c, N.J. Cheshire a, C.D. Bicknell a,b
856 errors recorded by teams during 185 aortic procedures

Median 4 (0-25) errors/procedure

Median 1.2 errors/hour
14 errors directly caused or clearly contributed to harm in 12 patients

6.5% of cohort

7 communication errors, 4 technical errors, 3 unanticipated problems relating to patient’s anatomy

**p<0.01 *p<0.05
Over 7 million safety events

Thematic analysis identifies 2572 from elective aortic surgery
• Error within the vascular (especially endovascular) operating environment is frequent

• Error leads directly to patient harm

• A prominent number of important errors come from:
  • Leadership, communication and team working
  • Specific equipment familiarity
  • Organisational issues
The proportion of respondents with positive perceptions of teamwork in ten vascular operating departments.

Distribution of teamwork scale-scores across vascular operating departments at ten different hospitals.

Lear R, Unpublished
SURGEON COGNITIVE LOAD

Mental rehearsal

Technical knowledge

Technical simulation

High fidelity immersive team simulation

Mirrored when measuring sympathetic response and NASA-TLX scores and related to technical performance

- US Airways Flight 1549
- 155 passengers
- January 15, 2009
- Captain Chesley B. "Sully" Sullenberger and First Officer Jeffrey Skiles, made an unpowered emergency water landing in the Hudson River after multiple bird strikes caused both jet engines to fail.
What we need to reduce error in vascular surgery:

– TEAM APPROACH
– TRAIN TEAM USING SIMULATORS TO REDUCE STRESS
– CULTURE
– PLANNING/REHEARSAL
– A NEW WAY OF DEALING WITH ERROR WHEN IT OCCURS
IMMERSIVE SIMULATED ANGIOGRAPHY SUITE

Imperial College London
IMPERIAL TEAM TRAINING

Multidisciplinary in teams
Structured
  • Routine
  • Emergency
  • Reactive
New pathways of care
Effective team strategies, e.g. rehearsal

Mentored, consultant led (culture)

Device specific
THE EFFECT OF TRAINING IN A TEAM

TECHNICAL INSTRUCTION

<table>
<thead>
<tr>
<th>Indications and principles of TEVAR</th>
<th>Technical steps</th>
<th>Technique</th>
</tr>
</thead>
</table>

SIMULATION 1

Simulated angiography suite team simulation with standard stressors

DEBRIEF

Video playback  Peer to peer feedback  Standardised team/leadership training

SIMULATION 2

Simulated angiography suite team simulation with standard stressors randomly selected

ASSESSMENT

Off line video analysis 3 observers
“on the night of the team training day, I was asked to assess a patient with paraplegia with a spinal drain ... effective management using new knowledge and skills from the course led to a reversal of the paraplegia”  VASCULAR NURSE
Cost of errors (5000 AAA repairs per year UK)

Based on equipment, consumables and delays (2017 prices)

<table>
<thead>
<tr>
<th>Errors Type</th>
<th>Frequency</th>
<th>Number</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor errors</td>
<td>3.82 per case</td>
<td>19100</td>
<td>£1,012,300</td>
</tr>
<tr>
<td>Major errors without harm</td>
<td>0.43 per case</td>
<td>2150</td>
<td>£1,296,450</td>
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<tr>
<td>Major errors with harm</td>
<td>0.08 per case</td>
<td>400</td>
<td>£822,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>£3,130,750</td>
</tr>
</tbody>
</table>

The true frequency of errors is higher and the true cost of each error is higher...

Does not include increased length of ITU stay and ward stay, missed procedures from delays, increased risk of complications, complaints, second victim costs and wider economic burden
KEY THEMES

• Error within the vascular operating suite is frequent ...and leads directly to patient harm

• Leadership, communication and team working/training with specific equipment are key.

• Training in the culture, led effectively

...I propose given this evidence that team training should be a mandatory part of training, and of effective institutional governance.

• We need to gather National data to understand whether there are translational benefits from immersive, contextual rehearsal and team training.
THANK YOU

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