Future Provision of Emergency Surgery in the UK

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UEMS
Belfast
May 2016
Emergency surgery 1990’s

- Trainee delivered
- Fitted around the elective service
- Experience +++
- Minimal oversight
- Variable outcomes
Emergency general surgery - UK

Early 21st century surgery UK

• Times of plenty....
• Cash injection into NHS
• Focus on reduction of waiting times
• Increased elective resources
• Relative under funding of acute care
• Wide variation in quality of emergency general surgery
Future provision of emergency general surgery

Variations in outcome

• Failure to prioritise
• Inadequate senior input
• Inadequate clinical leadership
• Unsatisfactory resources of infrastructure
• Unsatisfactory resources of manpower
• Poor management of service
Mortality in high-risk emergency general surgical admissions

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Fig. 1 Funnel plot showing all-cause risk-adjusted in-hospital 30-day mortality for English National Health Service hospital Trusts. Institutions above and below the upper and lower two standard deviation (s.d.) limits represent the respective high- and low-mortality outlying Trusts.
Mortality in high-risk emergency general surgical admissions

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Fig. 2 Hospital operating theatre and critical care provision for high- and low-mortality outlying National Health Service hospital Trusts. Values are mean with 95 per cent confidence intervals. ICU, intensive care unit; HDU, high-dependency unit. *P = 0.017 (independent-samples t test)

Fig. 3 Use of imaging in high- and low-mortality outlying National Health Service hospital Trusts. Values are mean with 95 per cent confidence intervals. CT, computed tomography. *P < 0.001 (independent-samples t test)
Outcomes following emergency surgery

- 1853 pts, 35 hospitals
- Unadjusted 30 day mortality 14.9% (3.6 to 41.7%)
- 24.4% mortality in >80 yrs
- Goal directed fluid therapy 0-63%
- 0-68.9% returned to ward post surgery (level I)
Variations in mortality after emergency laparotomy: the first report of the UK Emergency Laparotomy Network

D. I. Saunders¹, D. Murray², A. C. Pichel³, S. Varley³, C. J. Peden⁴, on behalf of the members of the UK Emergency Laparotomy Network

Table 2 Time of day, seniority of medical staff, and 30 day mortality. *Time of anaesthetic induction

<table>
<thead>
<tr>
<th>Time of day*</th>
<th>n</th>
<th>Consultant anaesthetist present (%)</th>
<th>Consultant surgeon present (%)</th>
<th>30 day mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–17:59</td>
<td>1044</td>
<td>75.2</td>
<td>80.8</td>
<td>14.2</td>
</tr>
<tr>
<td>18:00–23:59</td>
<td>442</td>
<td>54.8</td>
<td>67.7</td>
<td>17.8</td>
</tr>
<tr>
<td>00:00–07:59</td>
<td>152</td>
<td>40.8</td>
<td>61.8</td>
<td>20.3</td>
</tr>
</tbody>
</table>
Hotel NHS and the acute abdomen – admit 1\textsuperscript{st} then investigate

- 122 pts admitted with “acute abdomen” over one month
- “Necessary” n=56, median LOS 8.5 days
  - Surgery (n=36)
  - Death (n=3)
  - Severe illness (n=17)
- “Unnecessary” n=66, median LOS 5 days
- Total costs £330,468

£125,000 for unnecessary admissions (92% hotel costs)

Aryal K, Bhowmick A, Beveridge A, Scott NA

Future provision of emergency general surgery

Current issues 2015

- Variable (poor) outcomes
- Under-resourced service
- Reduced experience of junior staff
- Loss of team structure
- Unwillingness to engage in service improvement
- Lack of leadership
Future provision of emergency general surgery

Control the front door

- Number of admissions increasing
- Many unnecessary
- Juniors, locums etc
- SENIOR ASSESSMENT BEFORE ADMISSION
Ambulatory care - the Derby model
TABLE I

<table>
<thead>
<tr>
<th>CONDITIONS requiring admission</th>
<th>CONDITIONS suitable for ESAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peritonitis</td>
<td>Non-specific abdominal pain</td>
</tr>
<tr>
<td>Intestinal obstruction</td>
<td>Biliary colic</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Mild cholecystitis</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>Some abscesses</td>
</tr>
<tr>
<td>Intestinal ischaemia</td>
<td>Stable rectal bleeding</td>
</tr>
<tr>
<td>Severe cholecystitis</td>
<td>Chronic conditions without acute exacerbation</td>
</tr>
<tr>
<td>Trauma</td>
<td></td>
</tr>
</tbody>
</table>

ESAC = emergency surgery ambulatory care
Methods

- An ESAC team was formed with an experienced consultant surgeon and an assistant practitioner (for phlebotomy, cannulation, electrocardiogram).

- The consultant took referrals and triaged patients. Those not requiring hospital treatment were directed to the appropriate team, those requiring emergency admission went straight to the surgical assessment unit and those suitable were seen and assessed on the ESAC pathway.

Results

- In four months, 377 patients were seen by the ESAC team (out of a total of 1,028 referrals).

- Of these, 260 avoided admission
  - 31 per cent were discharged without needing follow-up
  - there were only six readmissions within 30 days of discharge.

- Satisfaction surveys from patients and GPs were very positive – with all 60 patients surveyed rating the consultation as good or excellent.
Future provision of emergency general surgery

**Acute biliary disease**
- Typical lengths of stay 5-7 days for acute cholecystectomy
- Unacceptable
  - Clinically
  - Financially
- Defined pathways required
  - Leadership
  - Imaging
  - Senior input
  - Access to planned non-elective theatre slots
Influence of time to surgery on outcome

Figure 3.1: Cumulative percentage of patients treated surgically for perforated peptic ulcer and percentage alive 30 days after surgery in relation to time after hospital admission, February 2003 to August 2009
Emergency Laparotomy Pathway Quality Improvement Care (ELPQuiC) Bundle

• Early assessment with mortality prediction and escalation where appropriate
• Broad spectrum antibiotics if perforation/sepsis suspected
• Once decision for surgery then next on list or within 6 hrs
• Early/ongoing goal directed fluid resuscitation
• All patients to ICU after emergency laparotomy
Use of a pathway quality improvement care bundle to reduce mortality after emergency laparotomy

S. Huddart\(^1\), C. J. Peden\(^2\), M. Swart\(^3\), B. McCormick\(^4\), M. Dickinson\(^1\), M. A. Mohammed\(^5\) and N. Quiney\(^1\) on behalf of the ELPQuiC Collaborator Group

Table 2  Lives saved (before 30 days) per 100 patients before and after introduction of the emergency laparotomy pathway quality improvement care bundle

<table>
<thead>
<tr>
<th>Site</th>
<th>Lives saved per 100 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before ELPQuiC</td>
</tr>
<tr>
<td>1</td>
<td>6.48 (4.64, 8.32)</td>
</tr>
<tr>
<td>2</td>
<td>6.76 (6.37, 7.14)</td>
</tr>
<tr>
<td>3</td>
<td>7.95 (5.66, 10.25)</td>
</tr>
<tr>
<td>4</td>
<td>4.34 (2.90, 5.78)</td>
</tr>
<tr>
<td>All</td>
<td>6.47 (5.79, 7.15)</td>
</tr>
</tbody>
</table>

Values in parentheses are 95 per cent c.i. ELPQuiC, emergency laparotomy pathway quality improvement care. *Linear regression model.

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www.bjs.co.uk  BJ'S 2015; 102: 57–66
• Before surgery
  – Senior input
  – Timely diagnostics
  – Risk assessment
  – Antibiotics
  – Prompt access to theatre

• During surgery
  – Involvement consultant anaesthetist and surgeon

• After surgery
  – Critical care use
  – Medical elderly review
Opportunities to address the challenges

There are four important opportunities to address the above challenges:

• the systematic use of protocols and pathways
• the increased use of more network-based approaches
• the development of new non-medical roles
• new training models.
Argument to centralise emergency services

- the shift from generalist to more specialist practice in surgery
- providing access to consultant-delivered care 24/7
- reductions in the number of doctors in training
- providing EGS services with the necessary diagnostic and other support services
- ensuring high-quality training
- the increasing constraints on NHS finances.
The argument for centralisation

Table 2.1: Distribution of caseload for major emergency general surgery procedures among cases with high-risk diagnoses,* pooled data 2009/10 to 2012/13

<table>
<thead>
<tr>
<th>Number of major procedures</th>
<th>Number of hospital sites</th>
<th>Proportion of total sites included</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 or fewer</td>
<td>10</td>
<td>6.5%</td>
</tr>
<tr>
<td>51 to 100</td>
<td>19</td>
<td>12.3%</td>
</tr>
<tr>
<td>101 to 150</td>
<td>37</td>
<td>24.0%</td>
</tr>
<tr>
<td>151 to 200</td>
<td>43</td>
<td>27.9%</td>
</tr>
<tr>
<td>201 to 250</td>
<td>29</td>
<td>18.8%</td>
</tr>
<tr>
<td>Over 250</td>
<td>16</td>
<td>10.4%</td>
</tr>
</tbody>
</table>
The argument for centralisation

Figure 2.1: 30-day in-hospital mortality rate grouped by number of major emergency general surgery procedures among cases with high-risk diagnoses, pooled data 2009/10 to 2012/13
Future provision of emergency general surgery

Where will care be provided?

- <10% of admissions require emergency laparotomy
- Assessment should be close to home
- Neighbouring hospitals need to collaborate eg PCI for MI, acute stroke etc
The future workforce for emergency surgery

**Issues**

- Non-medical roles
- Emergency vs elective practice
- The role of the specialist in emergency care
- The dedicated emergency surgeon
Career choices – current trainees

Figure 3.3: Which job would trainees go for? Results of a survey of 276 trainees (specialist training 3–8)

- Subspecialism, elective and emergency
- Subspecialism, general on call
- More initial EGS while subspecialism
- EGS + subspecialism
- EGS + elective general
- EGS full time

The future workforce in emergency general surgery

<table>
<thead>
<tr>
<th>Procedure (JCST guideline)</th>
<th>Breast</th>
<th>Vascular</th>
<th>UGI/HPB**</th>
<th>Colorectal</th>
<th>Transplant</th>
<th>General</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency laparotomy* (100)</td>
<td>34</td>
<td>30</td>
<td>62</td>
<td>73</td>
<td>20</td>
<td>100</td>
<td>55*</td>
</tr>
<tr>
<td>Hartmann’s procedure (5)</td>
<td>74</td>
<td>78</td>
<td>86</td>
<td>93</td>
<td>100</td>
<td>100</td>
<td>85</td>
</tr>
<tr>
<td>Appendicectomy (80)</td>
<td>82</td>
<td>63</td>
<td>90</td>
<td>93</td>
<td>60</td>
<td>100</td>
<td>84</td>
</tr>
<tr>
<td>Cholecystectomy (50)</td>
<td>65</td>
<td>59</td>
<td>100</td>
<td>89</td>
<td>80</td>
<td>100</td>
<td>81</td>
</tr>
<tr>
<td>Inguinal hernia repair (60)</td>
<td>66</td>
<td>70</td>
<td>93</td>
<td>93</td>
<td>60</td>
<td>100</td>
<td>83</td>
</tr>
<tr>
<td>Segmental colectomy (20)</td>
<td>82</td>
<td>74</td>
<td>86</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>86</td>
</tr>
</tbody>
</table>

* 75% met the modified indicative number of 75 emergency laparotomies.
** Upper gastrointestinal / hepato-pancreato-biliary.
Best practice 2016

- ELPQuiC bundle
- Pathway for the management of acute gallstone disease
- Pathway for surgical ambulatory care
- Direct telephone access to a senior decision-maker for GPs and paramedics
- Closer integration with medical teams
- Improved access to theatres (including optimising use with mathematical modelling).

“We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills”

JFK 1962