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**Improving Outcomes in Elective Surgery**

**Overview**

1. Who’s having surgery?
2. What factors affect adverse outcome?
3. What’s the nature of the complications?
4. How are we doing?
5. What can we do to improve the situation?

**The Ageing Population**

20% UK population aged >65

**The Physiology of Ageing**

- Decline in measurable parameters
- Preservation of organ function
- Reduced physiological reserve
- Concept of Homeostenosis

**More older people are undergoing surgery**


**What is the impact of age on co-morbidity?**

Barrett et al Lancet 2012  
Rocha J J W et al. BMJ 2005;331:1374

**Anesthesiol Clin North America 2000; 8:74**
The emerging role of frailty

- Reduced physiological reserve across multiple organ systems
- Varied research definitions
- Scales
  - Edmonton frail scale
- Surrogate markers
  - Grip strength, walking speed

Older people have more postoperative complications


<table>
<thead>
<tr>
<th>Age Group</th>
<th>Mortality</th>
<th>Complications</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65</td>
<td>5%</td>
<td>0.8%</td>
<td>0.3%</td>
</tr>
<tr>
<td>65-74</td>
<td>10%</td>
<td>2%</td>
<td>0.6%</td>
</tr>
<tr>
<td>75-84</td>
<td>12%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>&gt;85</td>
<td>15%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>p</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

What kind of complications and why do they matter?


<table>
<thead>
<tr>
<th>Any complication</th>
<th>1-year mortality with</th>
<th>1-year mortality without</th>
<th>30-day mortality with</th>
<th>30-day mortality without</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>with</td>
<td>without</td>
<td>with</td>
<td>without</td>
</tr>
<tr>
<td>Any complication</td>
<td>13.3%</td>
<td>0.8%</td>
<td>28.1%</td>
<td>6.4%</td>
</tr>
<tr>
<td>p</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.0004</td>
<td>0.2607</td>
</tr>
</tbody>
</table>

What about outcome in terms of geriatric syndromes?

- Functional impairment/disability
  - Deterioration in function persisting up to 6 months post colorectal surgery

- Postoperative cognitive disorders
  - Delirium: 200 more common than PE
  - POCD

How are we doing looking after older surgical patients?

An Age Old Problem 2010
Explore remediable factors in processes of care in patients aged 80 yrs or older who died within 30 days of surgery

Knowing the risk 2011
Prospective review of peri-operative care of all in-patient surgery
NCEPOD: where were the problems?

- Pre-op
  - 1 in 5 not pre-assessed
  - No PAC in 1 in 6 hospitals
  - Failure to optimise the patient
delays to theatre 20%
- Intra-operative
  - Substandard monitoring
- Post-operative
  - Inadequate monitoring, outreach and access to critical care (34%)
  - Inadequate MDT and Geriatrician input

Prevalent surgical model of care

- Surgical OP
  - Pre-Admission Clinic
  - Home
  - Complex Discharge
  - Complications
  - Ward
  - Surgery
- Intra-operative
  - Substandard monitoring
- Post-operative
  - Inadequate monitoring, outreach and access to critical care (34%)
  - Inadequate MDT and Geriatrician input

What is the benefit of an alternative model?

<table>
<thead>
<tr>
<th>Surgical OP</th>
<th>Day case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage nurse</td>
<td>Generic PAC (Nurse led)</td>
</tr>
<tr>
<td>Admissions</td>
<td>Specialist PAC (Nurse led)</td>
</tr>
<tr>
<td></td>
<td>POPS (proactive care of older people undergoing surgery)</td>
</tr>
<tr>
<td></td>
<td>Anaesthetist</td>
</tr>
<tr>
<td></td>
<td>Medical specialties</td>
</tr>
</tbody>
</table>

Surgical OP/PAC
- Proactive referral
  - At risk according to screening criteria
  - Patients diagnosed as medically unfit

The POPS model
- Pre-op CGA Clinic
  - Geriatrician
  - CNS
  - Physiotherapy
  - OT
  - Social worker
  - Patient education
- Post Discharge
  - Intermediate Care
  - Links with primary care/social care
  - Specialist clinic
  - Follow up (falls etc)
- Hospital Admission
  - Post-op geriatrician/CNS WR
  - Therapy liaison
  - Discharge planning
  - Teaching/training
- Liaison with:
  - Surgical team
  - Anaesthetists
  - GP
  - Community service
  - Patient

CGA: how does it work in practice?
1. Risk assessment
- Recognition of known comorbidity
- Identification of unrecognized disease, disability, frailty
- Capacity

2. Optimisation and risk reduction (pre-post)
- Medical, functional, psychological and social
- Prediction of post operative complications
  - Early identification of complications
  - Standardised management complications

3. Prediction of support required on discharge

4. Comprehensive documentation

**What is the evidence the service works?**

<table>
<thead>
<tr>
<th></th>
<th>Pre-POPS n=54</th>
<th>Post-POPS n=54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>75.0±6.1</td>
<td>74.3±6.2</td>
</tr>
<tr>
<td>Cardiac</td>
<td>33% (18)</td>
<td>55% (27)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>13% (7)</td>
<td>20.4% (11)</td>
</tr>
<tr>
<td>Renal</td>
<td>3.7% (2)</td>
<td>22.2% (12)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>51.9% (28)</td>
<td>80% (43)</td>
</tr>
<tr>
<td>Delirium</td>
<td>18.5% (10)</td>
<td>5.6% (3)*</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>20% (11)</td>
<td>4% (2)*</td>
</tr>
<tr>
<td>ACS</td>
<td>7.4% (4)</td>
<td>3.7% (2)</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>13% (7)</td>
<td>7.4% (4)*</td>
</tr>
<tr>
<td>Heart failure</td>
<td>3.7% (2)</td>
<td>0</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>11% (6)</td>
<td>2% (2)</td>
</tr>
</tbody>
</table>


**Postoperative multidisciplinary issues**

<table>
<thead>
<tr>
<th></th>
<th>Pre-POPS</th>
<th>Post-POPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncontrolled pain</td>
<td>29.6 (16)</td>
<td>1.9 (1)*</td>
</tr>
<tr>
<td>NBM &gt;4 days</td>
<td>9.3 (5)</td>
<td>0*</td>
</tr>
<tr>
<td>Catheter &gt;4/7</td>
<td>20.4 (11)</td>
<td>7.4 (4)*</td>
</tr>
<tr>
<td>Dependent transfers</td>
<td>14.8 (8)</td>
<td>0*</td>
</tr>
<tr>
<td>Bedridden &gt;3 days</td>
<td>27.8 (15)</td>
<td>9.3 (5)*</td>
</tr>
<tr>
<td>Pressure sores</td>
<td>18.5 (10)</td>
<td>3.7 (2)*</td>
</tr>
<tr>
<td><strong>Length of stay</strong></td>
<td>15.8±13.2</td>
<td><strong>11.5±5.2</strong>*</td>
</tr>
<tr>
<td>Delayed discharge</td>
<td>70.4% (38)</td>
<td>24.3% (13)*</td>
</tr>
<tr>
<td>- medical problems</td>
<td>37% (20)</td>
<td>13% (7)</td>
</tr>
<tr>
<td>- slow rehabn.</td>
<td>13% (7)</td>
<td>7.4% (4)</td>
</tr>
<tr>
<td>- wait for OT/equipment</td>
<td>20.4% (11)</td>
<td>3.7% (2)</td>
</tr>
</tbody>
</table>

**Can these results be reproduced and improved upon?**

- Teaching hospital
- DGH

- 2010 Length of Stay Hip Surgery
  - National Average 10.3

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Mean LOS</th>
<th>No POPS Median LOS</th>
<th>POPS Median LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Hip Replacement</td>
<td>&lt;65</td>
<td>5.2</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>&gt;65</td>
<td>9.5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Revision Surgery</td>
<td>&lt;65</td>
<td>6.5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>&gt;65</td>
<td>10.5</td>
<td>8</td>
<td>4.5</td>
</tr>
</tbody>
</table>

**In Summary...**

- Current system: multiple opportunities for improvement
- Optimisation is possible
- Growing need for better collaborative work across disciplines
- Need for further research
  - Multiple specific unanswered questions
  - Translation of evidence into widespread clinical practice