Survival post emergency surgery in patients aged over 90 years
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Citation

Abstract
Aim: We aim to assess the impact of age 90 years and above on mortality post emergency surgery. Methods: Data collected retrospectively between June 1999 and May 2007. Results: A total of 33 patients with age ranging between 90 and 96 (mean 92 years). Eleven (33%) patients died within 30 days of the operation, 8 (73%) had major and 3 (27%) had minor surgery. No mortality in ASA II but 50% and 33% mortality in ASA III and IV, respectively. In the surviving group (22; 67%), 14 (63%) had major and 8 (36%) minor procedures. The surviving group had a mean hospital stay of 44 days (range: 1-56 days). Sixteen patients (76%) were discharged home and 5 (24%) transferred to a community hospital. Conclusion: Surgery in the extreme elderly can be conducted successfully with discharge home and a good life expectancy. However, the period of rehabilitation is likely to be long and the ASA grading system is a good guide to predicting mortality.

INTRODUCTION
Life expectancy is increasing which, along with a falling birth rate, is resulting in an ageing population. This means that elderly patients are forming an increasing proportion of acute surgery. Reiss et al. found an increase in the proportion of patients aged over 80 from 0.7% to 7.5% between 1973 and 1989. Therefore, the question of whether to operate will increasingly include consideration of the patient’s age.

The decision to operate must include the operability of the condition and a full pre-operative assessment of the patient. Even a simple procedure can be harmful for patients with a poor pre-morbid condition. The decision to operate becomes particularly difficult in the emergency setting, when time is limited restricting the ability to assess the patient’s health and wishes.

In the past, surgery may have been withheld on account of the patient’s age. This is due to many surgeons holding the belief that extreme age is likely to lead to a poor outcome in terms of immediate survival and post-operative quality of life. This audit has been undertaken to look at the results achieved by a district general hospital when operating on the extreme elderly, in order to define if our current practice is appropriate, through the post-operative outcome.

METHODS
We gathered data on any emergency surgery carried out on patients aged greater than 90 years old at Yeovil District Hospital between June 1999 and May 2007 from the surgical logs. We recorded date of admission, date of operation, age, gender, ASA grade and procedure. We then traced the patients in January 2008 through the hospital computer records to determine date of death. The medical notes were not available for all the patients but for as many as possible we recorded the post-operative complications and discharge destination. From the gathered data we calculated the interval between date of admission and date of operation, length of hospital stay post operation, 30-day mortality rate and duration of survival post operation.

RESULTS
We had a group of 33 patients aged over ninety years undergoing emergency surgery at Yeovil district hospital between June 1999 and May 2007. Two of these patients had a repeat procedure within the same admission. The age of these patients ranged between 90 and 96, with a mean age of 92 years. Twenty-three of the 33 patients were women. Table 1 contains the collected data for each patient without any identifiable patient details.
Survival post emergency surgery in patients aged over 90 years

Figure 1
Table 1: Full data set without patient identifiable details

<table>
<thead>
<tr>
<th>No</th>
<th>Admission (pre-operational)</th>
<th>Operation (post-discharge)</th>
<th>Sex</th>
<th>ASA grade</th>
<th>Operation</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>5</td>
<td>F</td>
<td>3</td>
<td>DIVISION OF ADHESIONS</td>
<td>Home</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1</td>
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<td>2</td>
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<td>3</td>
<td>4</td>
<td>1</td>
<td>M</td>
<td>3</td>
<td>COLECTOMY AND ANASTOMOSIS</td>
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</table>

No patient died during surgery; however, eleven patients died within 30 days of the operation, resulting in a mortality of 33%. Three further patients died within a year of surgery. At the time of tracing, 10 patients remained alive. Of the 11 who had died more than one year post operation, the duration of survival ranged between 2 and 7 years, with a mean of 4 years.

The ASA grade was recorded for 27 of the 33 patients; 18% of the patients were ASA grade 2, 54% of the patients were ASA grade 3 and 9% were ASA grade 4 (Table 2). The decision of whether to or not to operate may have lead to the selection of patients with lower ASA grades. Of the patients who died within 30 days of surgery, none were ASA grade 2; however, there was an equal percentage of ASA grade 4 patients in each group. Chart 1 shows the percentage of patients in each ASA grade that died within 30 days of surgery or survived.

Figure 2
Table 2: ASA grade

<table>
<thead>
<tr>
<th>ASA grade</th>
<th>No. of patients who died within 30 days</th>
<th>No. of patients who survived</th>
<th>Total No. of patients</th>
<th>Total Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>18%</td>
</tr>
<tr>
<td>III</td>
<td>9</td>
<td>9</td>
<td>18</td>
<td>54%</td>
</tr>
<tr>
<td>IV</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>9%</td>
</tr>
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</table>

The type of operation is presented in Table 3 with a comparison of the number of patients for each procedure who died within 30 days of surgery or survived. Only one operation showed more deaths within 30 days than survivors: colorectal surgery with a ratio of 5 to 4. Chart 2 shows the numbers of major and minor procedures in those patients who survived and died within 30 days. For both groups a high proportion of the procedures are major and therefore the nature of the surgery is unlikely to affect the overall outcome.

Figure 3
Chart 1: ASA grade and mortality/survival

The type of operation is presented in Table 3 with a comparison of the number of patients for each procedure who died within 30 days of surgery or survived. Only one operation showed more deaths within 30 days than survivors: colorectal surgery with a ratio of 5 to 4. Chart 2 shows the numbers of major and minor procedures in those patients who survived and died within 30 days. For both groups a high proportion of the procedures are major and therefore the nature of the surgery is unlikely to affect the overall outcome.
The time delay between admission and operation varied between 0 and 66 days, this is presented in chart 3. The majority of the patients were operated on within a week of their admission, 24% were operated on the day of admission. One patient had a significant delay of 16 days. For those patients who died within 30 days of surgery, there was a
Survival post emergency surgery in patients aged over 90 years

delay between admission and surgery ranging between 0 and 16 days with a median of 1.

**Figure 7**
Chart 3: Delay between admission and surgery

For those who survived the initial post-operative period, they had a significantly long mean hospital stay of 44 days, ranging from 1 to 56 days. Of those who survived the admission during which they had emergency surgery, 16 (76%) were discharged home and 5 (24%) were transferred to a community hospital.

Of those patients who died within 30 days of surgery, a disproportionately high number were male, with a ratio of 6 to 5. The mean survival was 8.7 days post surgery with a range of 1-29 and a median survival of 3 days. The mean age was 93 years with a median of 92 years and a range of 90-99 years, therefore not raised in comparison with the overall group undergoing surgery.

**DISCUSSION**

The impact of the patient’s age on surgical outcome is a question that troubles the medical profession. Arenal et al. did not find age to be a significant predictor of mortality, morbidity or hospital stay.[2] With people now living in relatively good health into old age, major surgery can be well tolerated by the elderly[4] with the majority returning to normal functioning after elective surgery.[8]. However, other research shows increasing age to give a significantly higher risk of postoperative complications[12], and higher postoperative mortality[61235]. Therefore, our literature search had no conclusive result on the impact of age on post-operative outcome. Older age tends to correlate to a greater number of co-morbidities[12] and increasing numbers of co-morbidities are associated with increasing mortality[7]. However, despite the relative increase in co-morbidities associated with increased age, age has been shown not to correlate with mortality[78]. Functional status has been demonstrated to correlate with postoperative complications and in-hospital mortality[12]. Emergency surgery has been clearly shown to have a poorer outcome than elective surgery[9] but this trend increases with increasing age[16] and also results in longer hospital stays[912]. Emergency surgery may be undertaken in situations where elective surgery has been refused based on the change in the balance of acceptable risk[2]. Therefore we can conclude that preoperative functional status, co-morbidities and emergency surgery all contribute to poor surgical outcome. Each of these factors has been associated with increasing age but the question of age, when these variables are taken into account, has data to support either argument. Our data set shows a mortality rate that, although raised, can be interpreted as acceptable in the light of the multiple factors involved that increase mortality. The patients who survived the post-operative period had a relatively long survival, given their advanced age at the time of surgery; however, they underwent long hospital stays and continued rehabilitation in community hospitals during their recovery. Research has shown that over time surgical outcome, in terms of postoperative complications and postoperative stay, has improved in the elderly although overall mortality has not[5]. Therefore, the conclusion would appear to be that age should not be a consideration in the decision to operate in line with plans to eliminate the age-related bias in treatment as set out in the NHS plan[11].

Nordin et al. assessed the attitudes of the elderly to curative therapy; they found that the desire for curative treatment was equal to younger patients[10]. In fact, they found that elderly patients were more willing to accept disfigurement in the search of a cure. The ASA grade has been shown to be a predictor of mortality[35], post-operative complications[4] and life expectancy post-operatively[4]. Our data set agrees with those published.

**CONCLUSION**

This analysis offers some insight into our practice as numbers of elderly patients presenting for emergency surgery will continue to rise. The data shows that emergency surgery can be a reasonable option in the extreme elderly. However, we must take into account the long recovery time and further rehabilitation required post-operatively. Our data coupled with published literature show that ASA grading can be a very useful indicator. Further study would be very useful to determine how many patients presented but surgery was felt to be inappropriate, to gather in more detail the quality of life that was experienced post-operatively and to follow up the large number of patients in this group who remained alive at the time of this study.

The patients undergoing surgery would greatly benefit
undergoing elective surgery and therefore avoiding the increased risk of emergency surgery; therefore, all clinicians should consider the benefits of conducting elective surgery in the extreme elderly. The decision to operate should not be based upon the age of the patients and their wishes must remain paramount in their treatment.

References

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