Safe and sustainable increases in day case emergency surgery

ABSTRACT

Selected patients referred to emergency general surgery departments are suitable for day case emergency surgery with no overnight hospital stay. There are no well-described sustainable pathways for these expedited operations and in many hospitals patients undergo unnecessary admissions and experience long waiting times.

Methods: The authors proposed a new, sustainable, day case emergency surgery pathway which was implemented to streamline the assessment, treatment and discharge of acute surgical referrals. It requires rapid assessment of the patient by a senior clinician, and ready availability of diagnostic services and operating facilities. To assess this pathway, the authors conducted a prospective audit of general surgical referrals to a district general hospital in the UK.

Results: During the inclusion period 746 emergency referrals were assessed, 281 (37%) of these underwent an operation. Over a 5-month investigation period, the audit found that approximately 27% of all emergency general surgery patients requiring an operation could be managed with day case emergency surgery. This figure was maintained throughout the duration of the study. Operations included incision and drainage of abscesses, incarcerated hernia repairs and appendicectomies. The average length of stay of all surgical admissions decreased from 5 days to less than 3 days and the median time to senior review was 30 minutes.

Discussion: The authors have developed a pathway involving permanent members of the surgical assessment team that is sustainable over a 5-month period. The pathway has allowed rapid assessment of patients and reduced unnecessary inpatient stay in a sustainable and reproducible manner.

Surgical procedures can be stratified into four tiers as set out by the National Confidential Enquiry into Patient Outcome and Death (2004). These are defined as immediate, urgent, expedited and elective. The expedited group includes patients who have been referred as an emergency, but for whom an operation is deemed appropriate within days of presentation, rather than immediately or during the same admission. Some minor operations fall within this group, including incision and drainage of abscesses, laparoscopic appendicectomy, hernia repair, removal of retained products of conception, laparoscopic removal of ectopic pregnancy and manipulation of fractures under anaesthetic.

These operations have previously been shown to be safely and successfully performed as day case procedures (Loftus and Watkin, 1997; Mayell et al, 2007; Barker and Windsor, 2009). Commonly, these operations are either performed on a dedicated emergency theatre list or fitted in where possible onto elective operating lists. This can leave patients underprepared and can result in unavoidable cancellations when attempting to deliver an ad-hoc service. Cancellations not only lead to decreased patient satisfaction, but also increased hospital inpatient stay (Conaghan et al, 2002).

Several pathways have been presented in the literature for day case emergency surgery where patients are discharged home and brought back for an expedited operation. These models have been effective in improving inpatient stay, reducing readmission rate and increasing patient satisfaction, although none of them have been sustainable (Weale, 2002; Mayell et al, 2007). Previous attempts at designing a day case emergency surgery pathway have not been sustainable because of the traditional 'on-call' firm structure. Those patients who are stable and require expedited operations can safely be discharged to return on an allocated day, allowing the patient to avoid a stay in hospital, be nil by mouth and have a senior medical assessment before the surgery.

The lack of sustainability has partly been attributed to the rapid cycling of the junior members of the team, postponing of less urgent operations and competing consultant commitments, which leads the pathways to break down after a number of weeks (Conaghan et al, 2002).

The authors investigated the introduction of a sustainable day case emergency surgery pathway, which they planned to assess over a number of months to monitor its effectiveness and sustainability.

Methods

An emergency day surgery pathway was implemented to streamline the assessment, treatment and discharge of acute surgical referrals. This new pathway required the rapid assessment of the patient by a senior clinician, and the ready availability of diagnostic services and operating facilities. The pathway required a number of changes to the acute surgical services and the dedicated staff available.

In line with other hospitals, patients referred to the on-call general surgical team are reviewed by a team comprising a foundation year 1 doctor, a senior house officer, a registrar and a consultant. Recent alterations to this structure included the addition of an advanced nurse practitioner.

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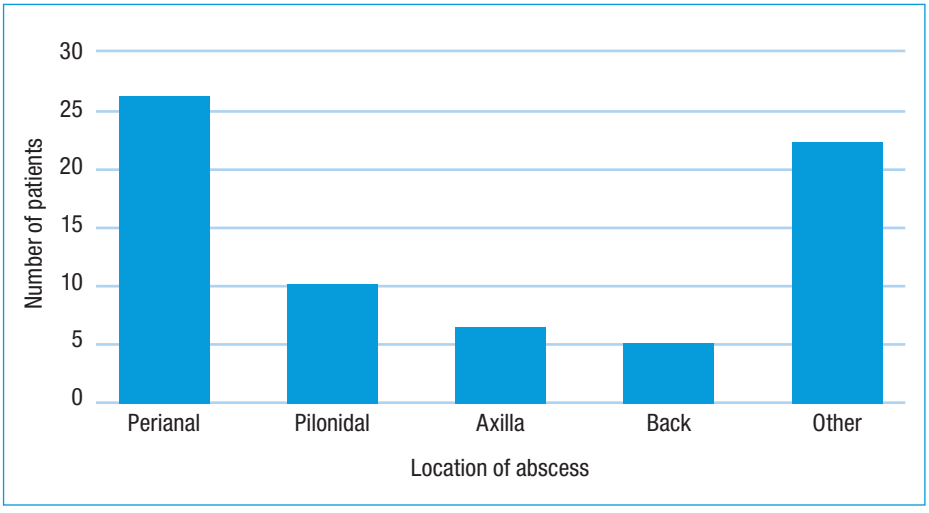
The advanced nurse practitioner, who was specifically trained in the assessment of surgical patients, cannulation and phlebotomy, had a designated role clerking the new admissions to the ward. This was supplemental to the on-call foundation doctors. Patients seen by the advanced nurse practitioner or foundation doctors were reviewed by a more senior member of the surgical team (registrar or consultant). Out of hours, stable patients could be assessed and discharged to be reviewed by a senior member of the team in the 'hot' clinic the following morning. This allows the patients to return the following day prepared for theatre. Patients seen and discharged before re-attendance for surgery were deemed to have had 'delayed day case emergency surgery'.

In addition to the usual on-call consultant, a second consultant was recruited to manage the emergency surgical list, allowing the first consultant to review ward patients. During normal hours this would allow senior review and booking onto the emergency list followed by same day discharge. Patients who underwent a procedure for their presenting complaint and were discharged within the same shift were deemed to have had 'rapid day case surgery'. If there was no space on the emergency list, patients could be discharged with instructions to ensure that they were prepared for theatre the following day.

Patients suitable for the day case emergency surgery pathway were those presenting with general surgical conditions (incision and drainage of abscess, appendicectomy, hernia repair, examination under anaesthesia and testicular torsion). This study did not include patients with gynaecology problems, excluding abscesses, or orthopaedic problems, excluding knee aspirations, as these were referred to a different service. Paediatric cases were not included. Exclusion criteria from the pathway included haemodynamic instability, uncontrollable pain and any condition that required increased surgical preparation such as diabetes mellitus.

During the study period, patient diagnoses, time to first assessment, time from attendance to senior review and outcome in all patients who presenting to the emergency surgical team were prospectively recorded. Data were collected on admission and also cross-referenced by using theatre log books and electronic records to ensure accuracy.

Figure 1. Incision and drainage of abscess that were treated on the day case emergency surgery pathway and the location of these abscesses across the entire duration of the study.



Results

Over the 5-month inclusion period, 746 patients were referred to the surgical emergency unit at the authors' hospital, either by the accident and emergency department or via the patient's GP. An operation was performed for the presenting complaint in 281 (37.7%) of these referrals.

Procedures

Of the 281 operations performed during the study period within the authors' unit, 64.7% were general surgical, 2.9% were vascular (debridement of gangrenous digits), 14.8% were urological, 11.8% were gynaecological and 5.8% were orthopaedic in nature (knee aspirations).

Of the 281 patients who underwent an operation, 27.1% (76/281) of these were entered onto the day case emergency surgery pathway with the remaining 72.9% (205/281) requiring an overnight hospital stay. Of the cases that were performed as day case emergency surgery the majority were general surgical (88.3%; 67/76) with the remaining 11.7% (9/76) being gynaecological in nature.

Of patients who were eligible for day case emergency surgery 89.5% had been diagnosed with an abscess that required incision and drainage. The locations of these abscesses managed by incision and drainage are summarized in *Figure 1*. The remaining 10.5% comprised hernia repair (2.6%), appendicectomy (2.6%), examination under anaesthesia (1.3%), debridement of soft tissue (1.3%) and testicular torsion (1.3%).

Of the 27.1% (n=76) of patients who underwent day case emergency surgery approximately half of these (52.6%, n=40) had their procedure the same day (day case rapid) and half as a day case delayed procedure (47.4%, n=36).

Length of stay

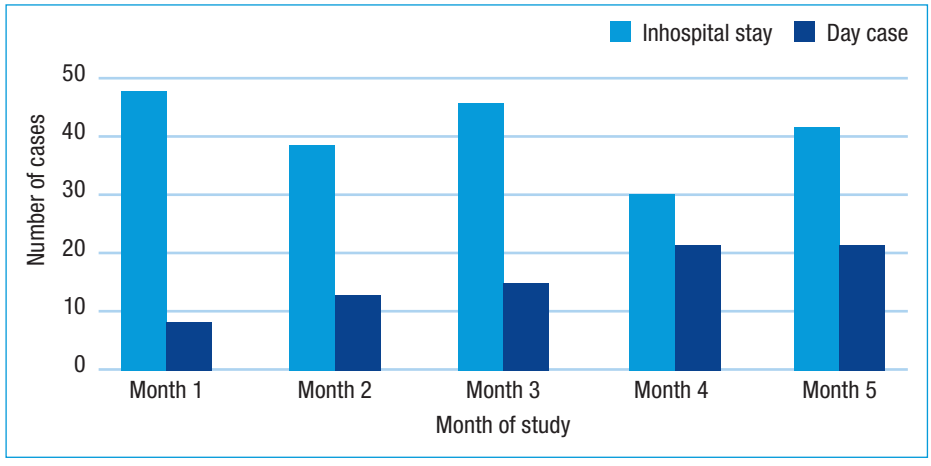
In the month before the introduction of the day case emergency surgery pathway, the average length of stay for all emergency surgical patients who had operations (including gynaecology) was 5.2 days. This reduced to 2.9 days in the fifth month of the day case emergency surgery pathway, which was a reduction of 2.3 days.

Outcome measures

Before the introduction of the day case emergency surgery pathway, the average waiting time to first review (foundation year 1 doctor) was 29 minutes. Using the day case emergency surgery pathway, the average waiting time from arrival in the surgical emergency unit to first review (either advanced nurse practitioner or foundation year 1 doctor) was 18 minutes (median 9 minutes). The average time for senior review (either consultant or registrar) was 55 minutes (median 30 minutes), compared to an average time of 1 hour 25 minutes before the introduction of the day case emergency surgery pathway.

None of the patients who were treated with day case delayed or day case emergency surgery was admitted as an inpatient and no surgical breaches of the 4-hour access standard were recorded.

Figure 2. The number of cases that were performed on the day case emergency surgery pathway compared to the cases that required direct admission to hospital over a consecutive 5-month period.



Sustainability

Of all operated cases, 27.1% (n=76) were completed as day case emergency surgery. This figure was sustained over the 5-month period and the number of procedures throughout this time is shown in *Figure 2*. The proportion of procedures completed as day cases actually increased (14.0% in month 1 *vs* 33.3% in month 5) with month 1 having statistically fewer day case emergency surgery operations performed when compared to the latter months (P<0.05, Chi-squared test).

Discussion

The authors have demonstrated a method of achieving sustainability in a day case emergency surgery pathway, designed to reduce inpatient stay while maintaining clinical safety. This pathway is easily reproducible in other centres and should be considered when designing access to the emergency surgical service.

Despite the introduction of the day case emergency surgery pathway, 72.9% of patients who required an operation were admitted to hospital on the day of presentation. This large proportion comprised patients who were either unstable to go home or had medical conditions necessitating management in a hospital setting in preparation for theatre. However, it may also have included some patients who were suitable for day case emergency surgery but as a result of subjective exclusion criteria, these could have been missed. The remaining 27.1% were eligible for day case emergency surgery either on the same day of presentation (day case rapid) or in the days following presentation (day case delayed). Rapid primary assessment by either the advanced nurse practitioner or the foundation year 1 doctor followed closely by senior review (on average within 55 minutes of arrival) meant that the patient could be prepared for theatre efficiently and promptly. There were no breaches of the 4-hour access standard from the emergency department recorded for patients referred to the surgical team during the inclusion period.

Day case delayed surgery made up 47.4% of all the day case emergency surgery; typically, these were patients who presented late in the day, when there was no theatre space left on the emergency list. In this study, the introduction of this pathway was an effective way of reducing overnight stay in hospital, which is both an advantage for the patient and cost effective for the hospital, as has been shown previously (Weale, 2002; Colegate-Stone et al, 2011).

It costs on average £400 per day for an NHS bed (Department of Health, 2015). The authors estimate that this pathway would save 800 overnight stays in hospital in a 1-year period, so this pathway would have saved approximately £320 000 over a 1-year period. As part of the new system, all patients are now seen by a senior surgeon in a timely fashion and this enhances the quality of care that patients receive from the on-call service. The junior doctor, anaesthetists and theatre staff have not changed in scope and therefore have not contributed to any additional costs. The key change has been the employment of the advanced nurse practitioner and having an additional consultant available during the day. The authors believe that these staff contribute significantly to the care of all patients referred to the on-call surgical team, not just those needing day case emergency surgery and therefore the potential costs are spread across the wider surgical patient base. The specific monetary cost benefit of the scheme is therefore difficult to calculate.

The sustainability of this pathway was demonstrated over a period of 5 months. This has been sustained by the introduction of permanent emergency members of staff and alterations in the traditional on-call surgical firm. The day case emergency surgery pathway was put to the test during month 3 when all of the junior doctors on the surgical team rotated to different specialities. Despite this, there was no decrease in the proportion of the patients who underwent day case emergency surgery.

The procedures that were performed as day case emergency surgery were mainly general surgical in nature and 89.5% of the day case emergency surgery procedures were incision and drainage of abscesses. The abscesses varied in location but the most common were perianal abscesses at 38.2% of cases. Incision and drainage of abscess has previously been shown to be suitable for day case emergency surgery and a potential target for the reduction in length of stay and postoperative complications when performed as a day case (Conaghan et al, 2002) and also therefore cost (Barker and Windsor, 2009).

When designing this pathway, the authors did not specify any absolute contraindications to day case emergency surgery. Previous studies have used exclusion criteria that have been implicated in high readmission rates (Fortier et al, 1998), for example increasing age, body mass index, medical comorbidities and proposed procedure (Miyagi et al, 2009). Clinical judgement was used to decide whether patients would be appropriate for day surgery, and good results were recorded with no readmissions from the day case emergency surgery pathway.

A telephone number was given to patients to act as a safety net if their condition unexpectedly changed when discharged home for day case emergency surgery. This would allow a rapid return to hospital if necessary (Amato et al, 2013). Other departments may consider including an additional courtesy follow-up telephone call, which has been shown to improve patient satisfaction within similar day case emergency surgery services (Conaghan et al, 2002).

Conclusions

The authors have introduced a successful and sustainable pathway for emergency day surgery by adapting the traditional on-call surgical firm. The pathway and structure that the authors propose is sustainable over a long period and can withstand the test of change in junior team members. Incorporating this pathway can allow rapid clinical assessment, improved preparation for theatre, and reduce hospital inpatient stay to achieve better clinical results and patient satisfaction. **BJHM**

Conflict of interest: none.

Amato B, Compagna R, Fappiano F et al (2013) Day-surgery inguinal hernia repair in the elderly: single centre experience. *BMC Surg* **13**(Suppl 2): S28 (doi: 10.1186/1471-2482-13-S2-S28)

Barker J, Windsor J (2009) Management of adult superficial acute abscesses in a tertiary hospital: time for incisive action. *N Z Med J* **122**(1295): 37–46

Colegate-Stone T, Roslee C, Shetty S, Compson J, Sinha J, Tavakkolizadeh A (2011) Audit of trauma case load suitable for a day surgery trauma list and cost analysis. *Surgeon* **9**(5): 241–4 (doi: 10.1016/j.surge.2010.10.008)

Conaghan P, Figueira E, Griffin M, Ingham Clark C (2002) Randomized clinical trial of the effectiveness of emergency day surgery against standard inpatient treatment. *Br J Surg* **89**(4): 423–7 (doi: 10.1046/j.0007-1323.2001.02055.x)

Department of Health (2015) Reference costs guidance 2014–15. www.gov.uk/government/uploads/system/uploads/attachment_data/file/402356/Reference_costs.pdf (accessed 22 February 2016)

Fortier J, Chung F, Su J (1998) Unanticipated admission after ambulatory surgery--a prospective study. *Can J Anaesth* **45**(7): 612–19 (doi: 10.1007/BF03012088)

Loftus IM, Watkin FD (1997) Provision of a day case abscess service. *Ann R Coll Surg Engl* **79**(4): 289–90

Mayell AC, Barnes SJ, Stocker ME (2007) Introducing emergency surgery to the day case setting. *The Journal of One Day Surgery* **19**(1): 10–12

Miyagi K, Yao C, Lazenby K, Himpson R, Clark CLI (2009) Use of the day surgery unit for emergency surgical cases. *The Journal of One Day Surgery* **19**(1): 1–8

National Confidential Enquiry into Patient Outcome and Death (2004) The NCEPOD Classification of Intervention. www.ncepod.org.uk/classification.html (accessed 19 February 2016)

Weale A (2002) Randomized clinical trial of the effectiveness of emergency day surgery against standard inpatient treatment. *Br J Surg* **89**(10): 1323 (doi: 10.1046/j.1365-2168.2002.02242_1.x)

KEY POINTS

- Performing day case emergency surgery is a safe method of managing certain surgical cases.
- By implementing a permanent team, sustainability of a day case emergency surgery pathway can be maintained.
- Day case emergency surgery pathways can reduce waiting times to see health-care professionals.