



Management of adult superficial acute abscesses in a tertiary hospital: time for incisive action

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Abstract

Aim Reduction in length of inpatient stay is an important factor in reducing healthcare costs in many hospital systems. This paper examines trends in hospital stay over time for general surgical patients presenting with abscess, and outlines the potential benefits if a day case service for acute abscess procedures was established.

Method Retrospective review of Otago Surgical Audit data from 1992 to 2007 yielded clinical data for 2475 adult general surgical cases at Auckland City Hospital with a primary or secondary diagnosis of abscess. A subset of patients potentially suitable for day case surgical procedures was analysed.

Results A steady increase in numbers of abscess cases treated by the Department of General Surgery was seen from 1992 to 2007. The most common types of superficial abscess were cutaneous (47%), perianal (40%), and breast (13%). Fifty-nine percent of general surgical hospital admissions in this series could potentially have been treated on a day case basis, but only 6% were actually treated as day cases. A median duration of inpatient stay of two days was required for a mean procedure duration of 16 minutes. A total of 1357 (90%) patients had a total hospital stay of more than 24 hours in the potential day case group. This accounted for 2338 bed days over the 15-year study period, or an average of 359 bed days per annum. For the most recent three-year period, the average total cost of each acute superficial abscess admission for less than seven days was \$4440. The average cost for a patient treated as a day case was \$1389, indicating a potential saving of \$3501 per patient if a day case service had been available.

Conclusion This study identifies a common problem which is being managed suboptimally in our hospital. Day case management of appropriate patients with acute superficial abscess would result in significant cost savings, decrease hospital bed occupancy and improve patient care.

Demand on acute operating theatres in busy hospitals means that patients with superficial acute abscesses often have to wait for many hours or days before relatively simple procedures can be performed. These patients either have procedures done late at night, after more urgent cases have been done, have to stay until the next day, with repeated periods of delay and starvation awaiting the availability of an acute theatre.

Demand on emergency departments means that these patients are admitted to a surgical ward pending treatment. Hospital bed occupancy is commonly more than 90% and patients admitted with acute minor problems often prevent elective admission of patients with major problems. Although most large hospitals have day case surgery units, there has been a tendency, at least in Auckland, for these to be on a different hospital campus from the acute services.

The Royal College of Surgeons of England, in its guidelines for day case surgery (1992), states that “day surgery is now considered the best option for 50% of all patients undergoing elective surgical procedures”.¹ Although this has not been extended to acute procedures, a number of studies have shown that certain types of abscess can be safely and successfully treated as day case procedures. These include superficial abscesses², pilonidal abscesses³ and Bartholin gland abscesses⁴. Follow-up has shown good results for patients after day case surgery. Patients in these studies were generally young and otherwise healthy, and required a relatively short operating time, so a day case service for such patients appears appropriate and feasible.

There are a number of potential benefits of day case surgery for patients with a superficial acute abscess. From a healthcare perspective these benefits include decreased hospital costs, enabling dollars saved to be allocated elsewhere, reduced risk of nosocomial infection and of development of antibiotic-resistant organisms, as well as decreased risks of further infection and complications. Importantly, a day case service would relieve pressure on hospital beds.

From a patients perspective, a day case service would also decrease the amount of time patients spend away from work thereby maintaining their productivity in the community, and decrease recovery time and inconvenience to patients and their families. Previous research in this area has suggested that patients with significant but controlled systemic disease (ASA score 3—severe but not life-threatening)⁵ may also be suitable for treatment as day cases⁶.

The aim of this study was to review trends in the management of adult patients with acute superficial abscesses over a 15-year period at a major tertiary hospital, and to determine if significant benefits would be obtained by managing them as day cases.

Methods

Study design—Patients were identified using the Otago Surgical Audit (Otago Clinical Audit and Outcomes Unit, Dunedin, New Zealand), an electronic surgical audit system that has been used in a wide spectrum of surgical practices in Australasia, and has been described in detail elsewhere.⁷⁻⁹ Data on all adult general surgical patients at Auckland City Hospital between 1992 and 2007 with a primary or secondary diagnosis coding of “abscess” were retrieved and entered into an Excel spreadsheet.

Data were screened for duplicate case records and non-abscess procedures. Of the remaining data (classified as “all cases”), a subset of patients who may potentially have been suitable for day case surgery was identified. Inclusion criteria were superficial abscesses; ASA 1 or 2; procedure length ≤ 60 minutes; no concomitant major procedure done in addition to abscess procedure; preoperative stay ≤ 5 days; postoperative stay ≤ 2 days.

Exclusion criteria included patient age ≤ 15 years); procedures that found no drainable collection, e.g. debridement alone or examination under anaesthesia alone. Patients not fulfilling all of the selection criteria for “potential day cases” were classified as “excluded cases”.

In addition, patients were identified in the study data who had actually been admitted, operated on and discharged on the same date, and were classified as “actual day cases”. This subset overlapped to some extent with both the “potential day cases” and “excluded cases” subsets.

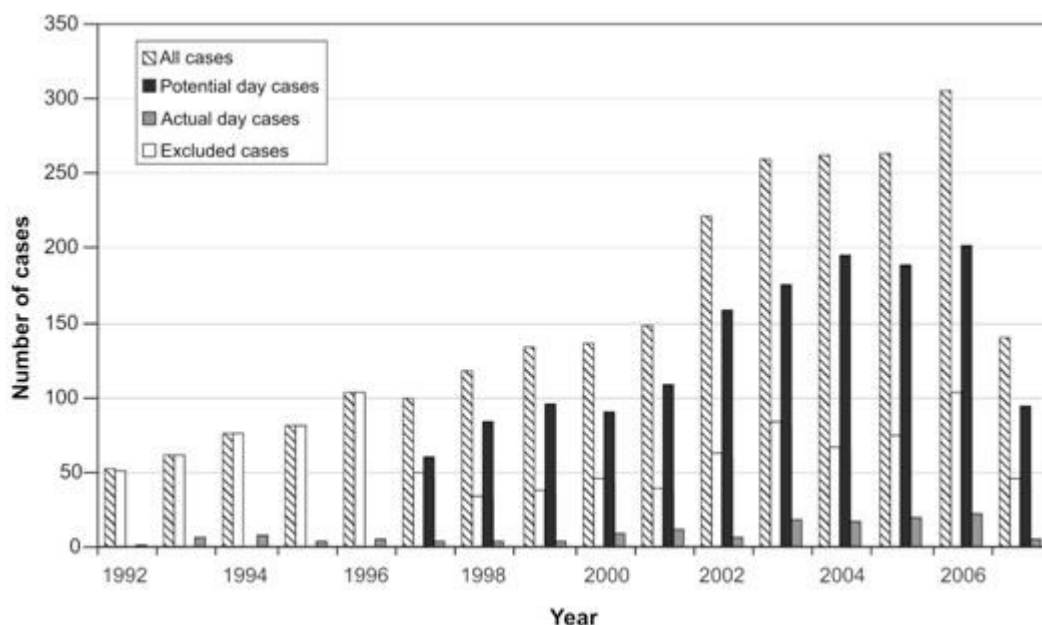
Data on these subsets were analysed with regard to median length of stay; mean duration of procedure; comparison with patients of ASA score 3 fulfilling all other criteria for a potential day case procedure; effect of surgical specialty on preoperative length of stay; trends over time in numbers of cases; trends in numbers of admissions and procedures performed on different days of the week; and types of procedures performed.

Statistical analysis—Chi-squared analysis was used to investigate for a significant difference in numbers of breast and perianal/rectal abscess cases performed by the three general surgical specialty teams.

Results

2475 patients were admitted with the diagnosis of abscess during the study period. Of these, 59% (n=1455) were classified as potential day case patients. Of the original 2475 patients, 6% (n=146) were actually treated as day cases. The annual incidence of abscess cases treated by the Department of General Surgery is shown in Figure 1 for each subgroup.

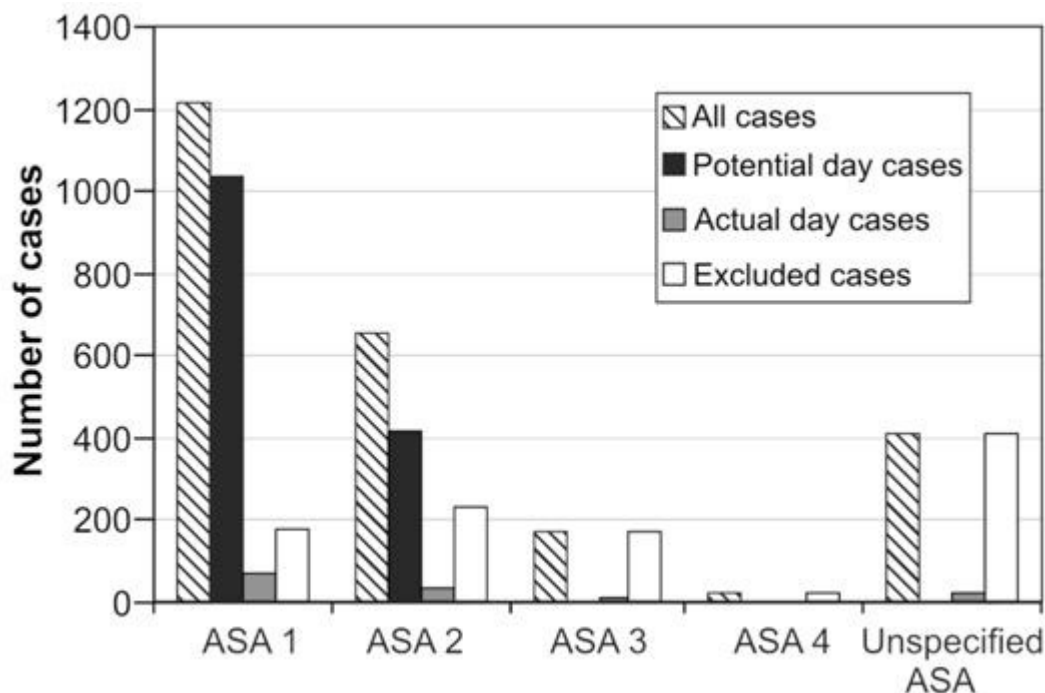
Figure 1. Annual incidence of number of admissions to the Department of General Surgery with a diagnosis of abscess from 1992 to mid-2007



The median age of patients classified as potential day cases was 33 years (range 15-88) and was not significantly different from that of patients treated as day cases (39 years, 15-83) or from that of those who were excluded as not being potentially suitable for day case surgery (40 years, 0-91). Overall there was a non-significant trend towards more males than females (1.1:1) and this was the case for each of the three categories.

Figure 2 shows the distribution of the ASA categories for the three patient groups. The potential day cases, by definition, were ASA 1 (71%) and 2 (29%).

Figure 2. Distribution of ASA categories in patients classified as potential day cases, actual day cases and excluded cases



The number and proportions of abscesses treated at each anatomical site is shown in Table 1. The mean procedure duration in the potential day case group was 16 ± 9 minutes (mean \pm SD) which was not different from that for the actual day case group (18 ± 10 minutes), but both were significantly less than for the excluded cases (35 ± 46 minutes, Mann-Whitney U, two-tailed, $p < 0.0001$).

Admission of potential day case patients resulted in a median hospital stay of 2 days (range 0–7, Figure 3). The median preoperative stay was 0 days (0–5), or less than 1 day, and the median postoperative stay was 1 day (0–2). A total of 1357 (90%) patients had a total hospital stay of more than 24 hours in the potential day case group. This accounted for 2338 bed days over the 15-year study period, or an average of 359 bed days per annum.

The influence of development of specialist teams within the Department of General Surgery on the management of abscesses at different sites was examined. Table 2 shows that there was a significant trend (Chi-squared 45.5, $p < 0.001$) towards breast abscess patients being managed by the Breast and Endocrine Team and perianal abscesses being managed by the Colorectal Team. Management by a specialist team had no noticeable effect on the length of preoperative hospital stay.

Table 1. Anatomical site, number of patients, type of surgical procedure, and duration of treatment for different types of abscess

Site	Treatment	Number	Duration of treatment (minutes) (Mean ± SD)
Breast	I & D alone	137	17 ± 8
	I & D ± other*	36	15 ± 9
	E & D alone	7	30 ± 15
	E & D ± other*	3	33 ± 25
	Aspiration	1	5
Perianal/rectal	EUA ± other**	1	8
	I & D alone	423	15 ± 9
	I & D ± other**	126	20 ± 9
	E & D alone	23	17 ± 9
	E & D ± other**	1	30
Cutaneous	Laying open***	7	25 ± 9
Buttock	E & D	4	13 ± 5
	I & D ± other*	119	13 ± 8
Trunk	E & D	13	20 ± 9
	I & D ± other*	99	15 ± 10
Limbs	E & D	3	10 ± 5
	I & D ± other*	152	13 ± 6
Other (single)	E & D	9	25 ± 15
	I & D ± other*	239	14 ± 9
Other (multiple)	E & D	2	20 ± 0
	I & D ± other*	44	19 ± 10
Wound abscess	I & D ± other*	6	16 ± 7

I & D = incision and drainage, E & D = excision and drainage, EUA = examination under anaesthesia; *I includes biopsy, curettage, debridement, washout ; ** includes insertion of drain/Malecot, insertion of Seton, proctoscopy/sigmoidoscopy, ultrasonography, biopsy, curettage, debridement, washout, banding of haemorrhoids; *** includes fistula operation.

Table 2. Management of breast and perianal abscesses by three specialist teams within the Department of General Surgery (3 × 2 Chi-squared 45.5, p<0.001)

Type of abscess	Colorectal Team	Upper GI Team	Breast & Endocrine Team
Breast	48	43	93
Perianal	256	169	152

Influence of day of the week on numbers of admissions and procedures was also examined. Overall, there was a decrease in the numbers of admissions and procedures from Monday to Sunday. Figure 4 demonstrates that there was not a consistent match between the number of admissions and procedures performed on a day to day basis. On Monday and Friday, the number of admissions exceeded the number of procedures. The number of procedures exceeded admissions on Wednesday, Thursday, and Saturday.

Figure 3. Frequency distribution of preoperative, postoperative, and total hospital stay for potential day case patients

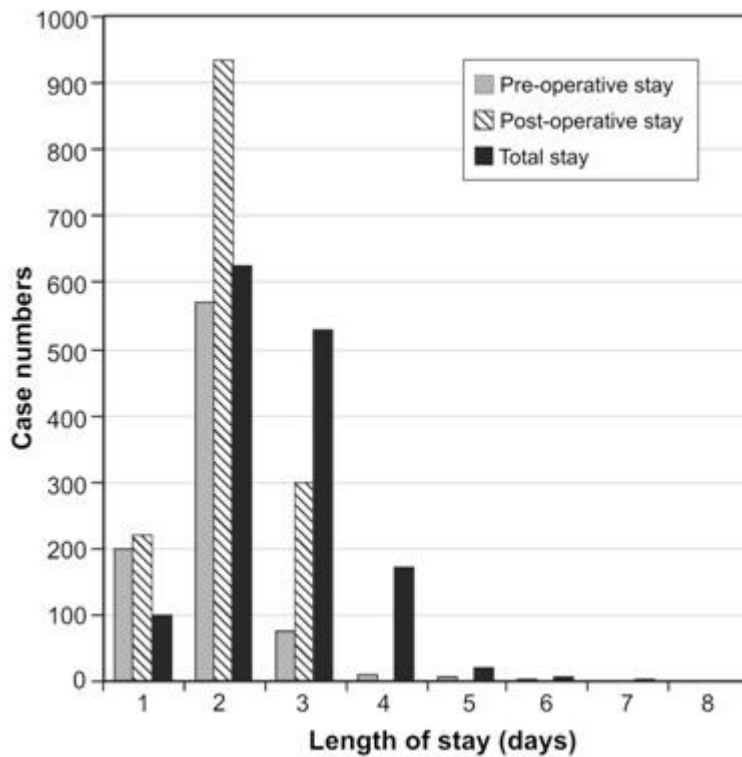
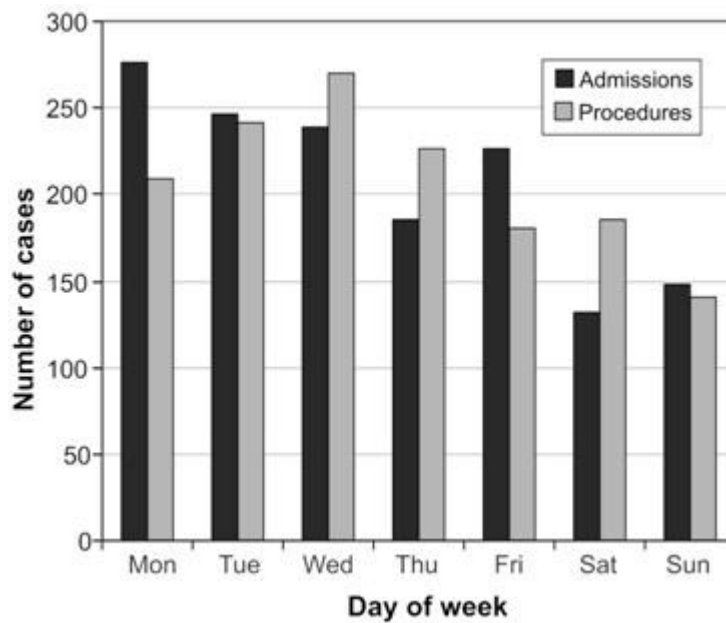


Figure 4. Number of admissions and number of procedures for each day of the week (pooled study data)



Discussion

These findings indicate that of all the patients with superficial acute abscesses admitted under general surgery, 59% could have been managed as day cases without requiring hospital admission. This relatively large group of patients, on average, spent 2 days in hospital awaiting a surgical procedure that took a mean duration of 16 minutes. The suitability of these patients for day case procedures is supported by the similarity of their demographic characteristics and procedure durations to those of actual day cases over the study period.

Finance Department records from Auckland City Hospital indicate that for the most recent 3-year period each superficial acute abscess admission for less than 7 days incurred an average cost of \$4440. The average cost incurred by a patient with superficial abscess cases that was performed as a day case was \$1389. This indicates a potential saving of \$3051 per patient if a day case service was provided for suitable patients.

In 2006 there were 202 admissions of potential day case patients with superficial abscess. It is therefore estimated that a potential saving of \$616,302 could have been made during 2006. Significant savings can also be estimated on the basis of hospital bed occupancy. For example, in 2006, approximately 404 days of hospital stay (202 potential day cases × average 2 days' stay) could have been saved if an appropriate day case service were available. In view of the anticipated increase in numbers of superficial abscess patients in the future, provision of a day case service could translate into even greater healthcare cost savings in terms of hospital stay.

Our results show an increasing number of total and potential day case abscess patients being admitted to hospital under general surgery from 1992 to 2006. There are several possible explanations for the observed rise. It might be due to increasing compliance with registration of abscess cases in the Otago Surgical Audit database over time.

It was noted that very few potential day cases were recorded from 1992 to 1996, which may reflect registration of only non-superficial abscess types in this time period. The increase might also result from fewer abscesses being managed in the community by general practitioners and by staff in the Emergency Department. At least part of the increase is likely to arise from a real increase in the incidence of abscesses in the general population.

Irrespective of the explanation, this study suggests that there will be an increasing number of abscess case admissions in the future, potentially exceeding available healthcare resources. This alone would be a compelling reason for provision of a day case service for the management of patients with superficial acute abscess.

It is not difficult to envisage what would be required to provide a day case service for the management of superficial acute abscesses. The initial treatment of these could be done "at the front door" in an Emergency Department treatment room, in a procedure room associated with an acute admissions ward, or in a theatre associated with an on-site day case surgical facility. The introduction of such a service is not complicated, but would require a culture change and the availability of a surgical registrar. If a general anaesthetic were required, then this might still be possible in a day case

facility. Patients could be discharged for review the following day, at the time of the post-acute ward round.

A previous study showed no difference in complication rates between patients with ASA score 3 and those with ASA 1 and 2 undergoing day case surgery⁶. In Natof's 10-year prospective study of 13,433 patients at a freestanding ambulatory centre in the US, 403 patients were classified according to ASA score. These included patients with hypertension, history of coronary occlusion, rheumatic valvular heart disease, asthma, chronic pulmonary disease and diabetes mellitus. There were three complications in the ASA 3 patients, and there was no statistical difference in complication rate between these patients and ASA 1 and 2 patients.

No significant differences were observed in mean procedure duration or median preoperative and postoperative hospital stay between patients with ASA score of 3 (severe but not life-threatening systemic disease) and patients with ASA 1 and 2 who were deemed suitable for day case procedures. Unfortunately no data on complication rates in these groups were available for comparison. The lack of a significant difference in duration of postoperative hospital stay between the groups^{6,10} supports the theory that some patients with uncomplicated controlled systemic disease could be candidates for day case surgery. Indeed, a number of ASA 3 patients (n=12) had actually undergone day case procedures over the study period.

If patients with uncomplicated controlled systemic disease were considered potentially appropriate candidates for day case surgery, it is expected that they would be assessed on a case by case basis with regard to age, comorbidities, anaesthetic risk, expected duration and complexity of their procedure and estimated probability of postoperative complications¹¹. It would not be necessary to consider ASA 3 patients for day case management to achieve significant savings, and this might be considered as a second stage in the introduction of such a service.

The three specialised general surgical teams at Auckland City Hospital rotate admitting days on an equal basis, and would be expected to admit similar numbers of patients with each type of abscess. The admitting team might hand over particular types of abscess to a specialist team to do the procedure. It is standard policy for such handovers to be made the morning following admission, although in practice this may sometimes be done on the same day. The effect of handover to a specialist team was apparent in this study.

Significantly more perianal and rectal abscess procedures were performed by the colorectal team, and significantly more breast abscesses by the head and neck/breast/endocrine team. It was expected that the handover process would result in a longer preoperative stay for these types of abscess when the surgical procedure was performed by the corresponding specialist team. However there was no difference in preoperative stay between patients with perianal/rectal abscesses and those with breast abscesses under the specialist teams.

Although there were more potential day case admissions on Mondays which generally tapered over the remainder of the week, a mid-week spike was seen for numbers of procedures performed. Numbers of admissions and procedures were almost equal on Sundays. This suggests that patients admitted on Mondays are more likely not to have a procedure until the following day or two days later. A trend was seen of more

admissions on weekdays for the potential day case group. This is surprising, because it was expected that patients would be more likely to present to hospital in the weekends when the majority would not be working and most general practices are closed, or at least that similar numbers of patients would present on weekends and weekdays.

Possible explanations for this trend may be that either more abscess procedures are performed by ED staff or there is a true increased rate of patient admission on weekdays. Unfortunately, no complete dataset was available for analysis from the Auckland City Hospital Emergency Department on their abscess admissions and procedures.

A limitation of this study is that it was a retrospective audit of a surgical database and is therefore prone to input bias. It is unlikely that all abscess procedures undertaken over the study period were included. Also, there was increased compliance with the registration of cases over the study period. Another limitation is that there are no reliable data on complication rates.

Further research might include a prospective study of ASA 3 patients compared with ASA 1 and 2 patients regarding management and outcome of those treated as day cases. It would also be useful to do a community-wide study to look at the management of superficial acute abscesses in all settings, including self-care, family practices, private accident and emergency facilities, public emergency departments, existing day case facilities, as well as inpatient care.

Conclusion

This study is important because it highlights a common and increasing problem that is being managed inefficiently. The day case treatment of appropriate patients with superficial acute abscesses has the potential to save expenditure, release hospital beds and improve the overall care of patients.

Competing interests: None known.

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