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Evaluation of an ambulatory abscess pathway in a district general hospital and the impact of COVID on ensuring long term compliance.

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Introduction

Superficial skin abscesses are common and can lead to significant illness if not managed promptly. The gold standard treatment is incision and drainage (I&D), as, often antibiotics alone do not lead to resolution. This multi-cycle retrospective study audits the practice in a district general hospital by assessing the efficiency of a day case abscess pathway.

Methods

Phase 1 established standards for creating the pathway by streamlining patients to be operated on dedicated days, phase 2 evaluated the effect on waiting times for I&D, and phase 3 assessed the efficacy of the pathway after the impact of COVID. Data collected includes gender, age, comorbidities, time of admission to the surgical assessment unit, time sent for by theatre, anaesthetic agent, and discharge date.

Results

Phase 1 was conducted from 2017 to 2018, included 87 cases, and the average wait time was 8 hours 29 minutes for I&D. Phase 2 included 32 cases from August to October 2019, showed an average wait of 4 hours 43 minutes with 2 patients requiring overnight admission. Phase 3 included 208 patients from January to December 2022, showed an average wait of 4 hours 55 minutes with 21% requiring an unplanned overnight admission.

Conclusion

This study showed that there is significant benefit of a day case abscess pathway. It leads to fewer admissions, improving patient satisfaction and saving money for hospital trusts. There needs to be strict criteria to ensure that appropriate patients are triaged to them. This will require ongoing refinement and both medical and nursing staff education.

Introduction

Superficial abscesses remain one of the most common acute presentations on a surgical take a1a. These abscesses can often progress rapidly, forming large, pus-filled collections which can occasionally become life-threatening infections a2a. There has been much debate regarding the use of antibiotics for the treatment of superficial abscesses. A large meta-analysis by Fahimi et al. concluded that there was no benefit to using antibiotics in the treatment of superficial skin and soft

tissue abscesses a3a. Nationally, the gold standard for treatment remains incision and drainage (I&D) a4a.

Patients requiring an emergency general surgical operation are often triaged into one centralised emergency theatre. This follows principles that were set out by Buck et al. in 1986 when they published a report titled, 'The Confidential Enquiry into Perioperative Death (CEPOD)' (5). They concluded that there was a reduced mortality rate if all resources were pooled to allow the running of one location out of hours to treat those that were the most unwell a5a.

Patients with abscesses are often booked into the emergency (CEPOD) theatre list. However, the CEPOD theatre is shared between multiple specialties including general surgery, gynaecology and ENT, and often CEPOD theatres have a very high workload when compared to other theatres. Patients requiring incision and drainage are often low priority on this list, when compared to life-threatening surgical emergencies. As a result, there is often a significant delay to definitive treatment, as antibiotics alone do not lead to resolution (3). To prevent the spread of infection, they are often left until the end of the list and subsequently get cancelled when time runs out or a more urgent case presents. This results in poor patient experience and increased morbidity.

Delayed surgery leads to increased bed pressures, financial costs, prolonged fasting times, increased morbidity (e.g. worsening pain), and patient dissatisfaction. There have been a number of studies which highlight the benefit of a fast-track day case abscess pathway (6,7,8). Australian tertiary centre studies have shown that it could be successfully implemented and remained easily accessible a6a. They showed that a dedicated day case abscess pathway reduced hospital length of stay, time to theatre and showed that there was no difference in readmission rates (7).

As day case surgery pathways run successfully and effectively, many hospitals have introduced pathways for patients who can be streamlined via ambulatory emergency surgery pathways. Ambulatory surgical pathways have also become even more prominent after the COVID-19 pandemic, as bed pressures were higher and thresholds to admit patients were re-evaluated, in order to limit the spread of infection. The British Association of Day Surgery (BADS) have highlighted that incision and drainage of an abscess is suitable for a day case procedure a7a.

There was significant investment of both time and resources into these pathways prior to the pandemic. However, it led to significant changes in surgical practice. A large retrospective analysis of surgical cases at a tertiary hospital in the United States showed that numbers for both elective and emergency surgeries decreased (9). Patients were noted to have more extensive disease and haemodynamic instability when there was surgical delay (9). This is one of many studies which showed that there were delays in patients seeking care which led to simple operations becoming more complicated. Post pandemic, there has been a drive to increase productivity and reduce financial burdens on trusts.

Overall, research highlights that the implementation of an ambulatory abscess pathway can significantly reduce waiting times in hospital, improve patient outcomes due to quicker access to theatre, and improve patient experience (6). It has also been shown to reduce financial costs due to reductions in length of stay in hospital.

Methods

The aim of this study was to evaluate the efficiency of the treatment process for an adult patient presenting with a superficial skin abscess requiring incision and drainage. We evaluated the waiting time for theatre to prove that there was a clinical need for an effective and streamlined service for these patients. We then created an ambulatory day case abscess pathway via our Surgical Assessment Unit (SAU) for these cases to be done in CEPOD or in an extra available theatre. We aim to show that this pathway has successfully improved waiting times, is more cost-effective and leads to better outcomes for both the patient and financially for the trust. We also

considered the impact of COVID on long-term sustainability and compliance with this pathway.

Incision and drainage for abscesses has been identified as an appropriate day case procedure. Patients who are suitable to be treated via a day case ambulatory pathway should be identified promptly at the time of initial review and managed according to this pathway. Those requiring emergency incision and drainage of an abscess on this pathway should wait less than 6 hours from arrival to SAU to being sent for in theatre. These standards were set during the initial phase of this study and adherence was re-evaluated after the abscess pathway was put in place.

This closed loop multi-cycle retrospective study was conducted in 3 phases; phase 1 (pilot phase) looked at waiting time for incision and drainage (I&D) prior to a pathway being introduced, an abscess pathway was then initiated and phase 2 comprised of a re-audit. The abscess pathway was implemented using the already existing SAU, where patients would be identified as suitable for the pathway and then have same day surgery or return on the day of surgery. Phase 3 occurred following the COVID-19 pandemic and a further cycle was repeated. Retrospective data was collected for all 3 phases of this study. Patients excluded from the dataset were those admitted due to clinical reasons such as those with sepsis or diabetes, immunocompromised patients, those with breast abscesses, or those without a recorded arrival time.

Phase 1 (pilot):

9 months' data between 1st June 2017 and 28th February 2018 was collected, and patients requiring I&D were identified by searching the theatre database system (TheatreMan, Trisoft, UK) for all patients who had procedures coded as 'incision and drainage' or 'abscess'. The time between arrival to SAU and time 'sent for' from theatre was calculated for each patient to determine the waiting time for surgery. Other patient data collected includes age, gender, site of abscess, type of anaesthetic, theatre location, how many days after presentation I&D was done and discharge date.

Phase 2:

An abscess pathway was implemented in order to improve patient flow and allow systemically well ambulatory patients to be able to access dedicated emergency theatre lists three times a week on Monday, Wednesday and Friday (Figure 1).

Patients who were identified as requiring I&D were discharged and asked to return at 11am on a day with a dedicated theatre for these cases. The patients that had emergency I&Ds were identified using the TheatreMan coding system as per the previous phase and a retrospective re-audit of 3 months' data between August and October 2019 was then completed. Patient notes were then evaluated to collect data with similar parameters to phase 1. Exclusion criteria was the same as for the previous phase (Figure 1).

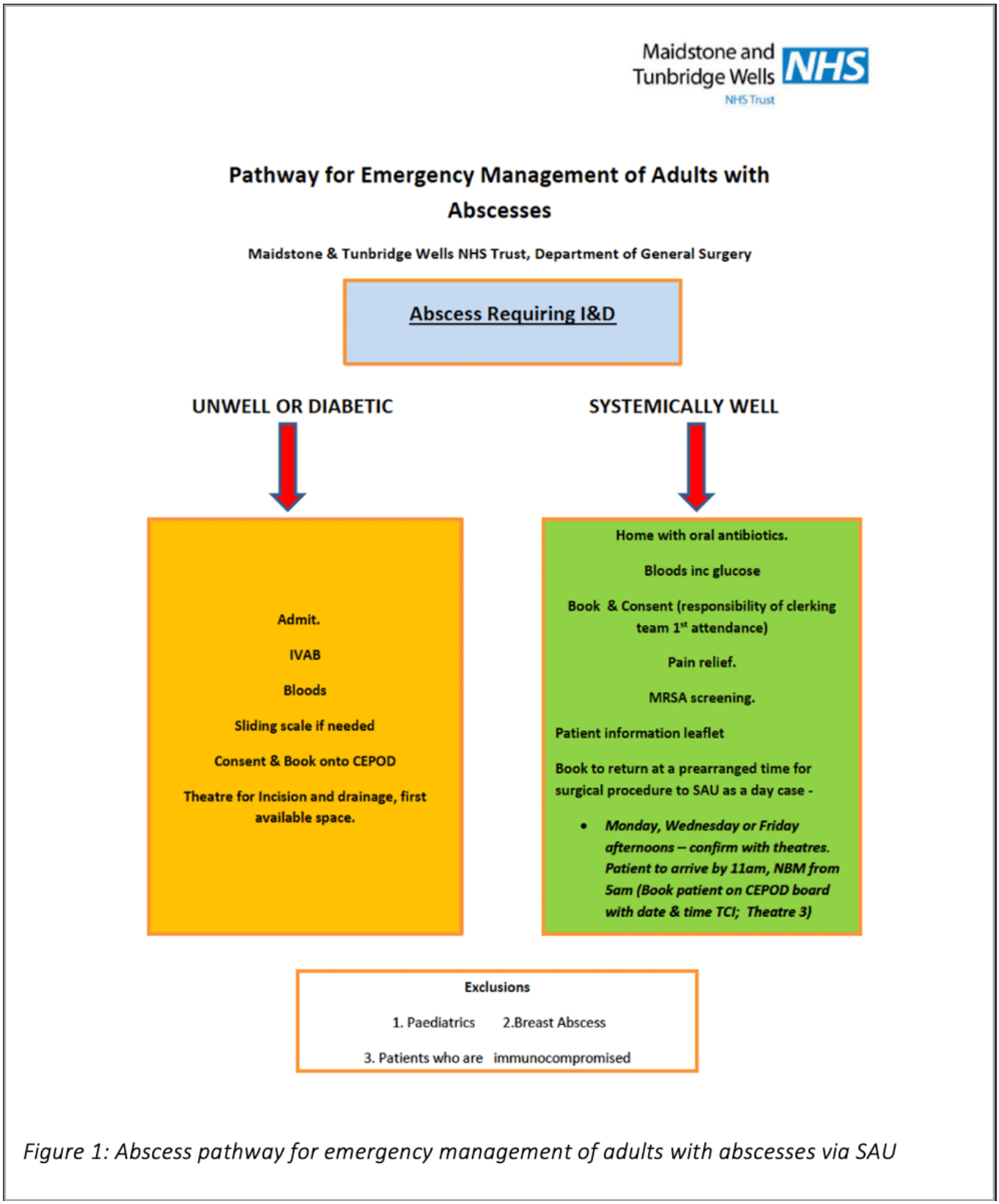

Figure 1: Abscess pathway for emergency management of adults with abscesses via SAU

Figure 1.

Phase 3:

Data was collected prospectively for 12 months from 1st January to 31st December 2022. Patients with abscesses and seen in SAU via the abscess pathway were logged by SAU staff over the year. Retrospective analysis of these patients was conducted; TheatreMan was used to exclude those patients that did not go on to have emergency I&D. Electronic patient records (Sunrise, Sunrise Software, UK) were used to exclude those patients who were admitted due to clinical reasons. More extensive patient data was collected in this phase, which included: age, gender, date and time of initial presentation, date and time of arrival to SAU on the day of surgery, time sent for theatre, waiting times, site of abscess, theatre location, discharge date and reasons for post-operative admission. Exclusion criteria was similar to previous phases, however, patients 16 or over were included if they were placed on the abscess pathway via SAU.

Results

Phase 1:

There were 87 cases in total over 9 months. The average waiting time for an I&D was 8 hours 29 minutes, and 56% of these patients had their operation within 6 hours.

Phase 2:

Of the 32 cases managed on the abscess pathway (out of 58 total), 25 (78%) of these patients were sent to theatre within 6 hours of arrival to SAU, and the average waiting time was 4 hours 43 minutes. The remaining 7 patients had waiting times of over 6 hours due to long CEPOD lists and other urgent operations which took clinical precedence. 2 patients were admitted overnight post-operatively due to late operation time and episode of pyrexia.

Phase 3:

Over 2022, there were 208 patients in total who were managed via the abscess pathway (Table 1). Age of patients on the abscess pathway ranged from 16 to 86 years old, with mean age being 42 years old, and 36 patients being aged 60 or over as shown in Figure 2. There were 84 women, and 124 men who underwent a range of procedures, as summarised in Table 1 below.

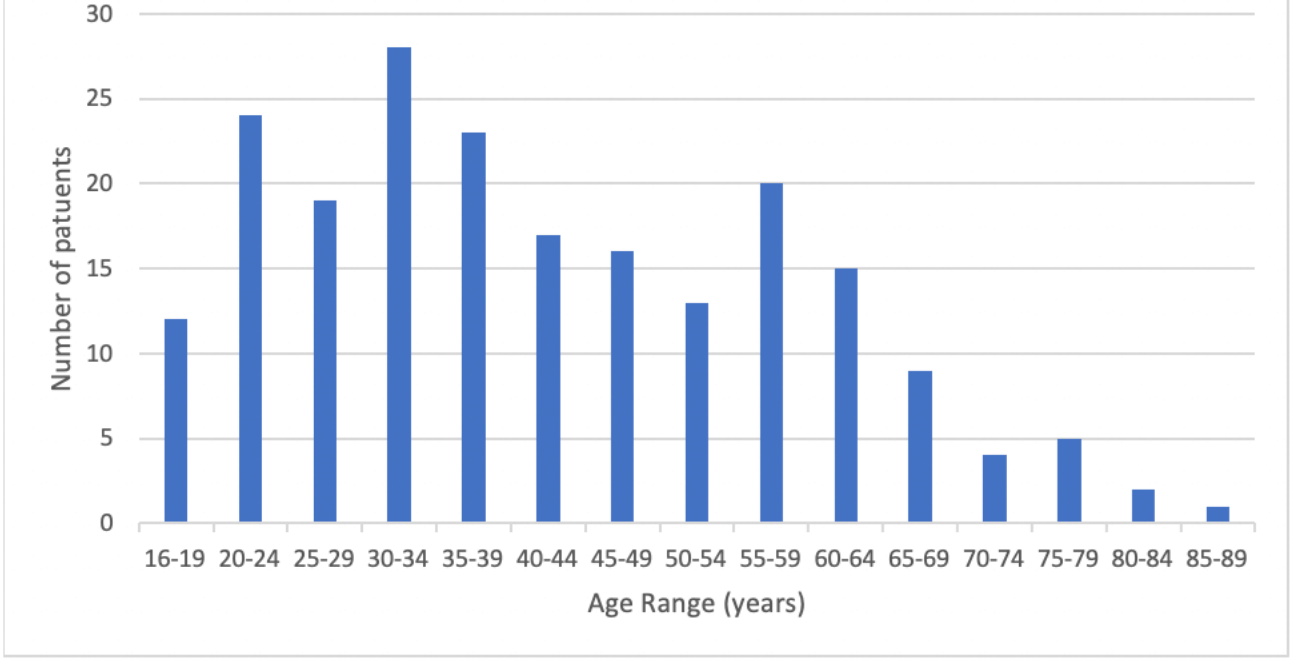

Figure 2: Distribution of age of patients in Phase 3 results

Figure 2.

177 out of 208 (85%) of these patients were operated on in CEPOD theatre, and the remaining 31 patients (15%) had their I&Ds in a different theatre. 104 patients (50%) had their I&D on the same day (day 0) as their initial presentation, 95 (46%) returned the following day to have surgery, and 8 patients (4%) underwent surgery on day 2. 1 patient chose to return on a specific day for their surgery and had their I&D on day 3. In total, this pathway saved 120 patients from a total of 146 nights in hospital.

Categories	Number of patients	Percentage of total (%)
Age (n=208)		
<60 years	172	83%
>=60 years	36	17%
Gender (n=208)		
Male	124	60%
Female	84	40%
Type/Location of abscess (n=208)		
Anterior abdominal wall	5	2%
Axillary	18	9%
Back	27	13%
Chest wall	4	2%
Gluteal	17	8%
Groin	10	5%
Neck	2	1%
Perianal	79	38%
Pilonidal	44	21%
Suprapubic	2	1%

Waiting time (n=208)		
<6 hours	137	66%
>6 hours	71	34%
Theatre (n=208)		
CEPOD	177	85%
Elective theatre	31	15%
Anaesthetic (n=208)		
General	203	98%
Local	2	1%
Spinal	3	1%
I&D on which day of presentation (n=208)		
Day 0 (same day)	104	50%
Day 1	95	46%
Day 2	8	4%
Day 3	1 (patient choice)	<1%
Length of stay in hospital (nights admitted after I&D) (n=45)		
1 night	40	89%
2 nights	4	9%
3 nights	1	2%
Reasons for overnight admission (n=45)		
Requires IV antibiotics post-operatively	5	11%
Medical reasons	2	4%
Late surgery	13	29%
No documented reason	25	56%

Table 1. *Table 1: Summary of Phase 3 results*

137 patients were sent to theatre for their I&D within 6 hours of arrival to SAU (66%). The waiting times ranged from 9 minutes to 15 hours and 20 mins, with the average waiting time being 4 hours 55 minutes.

45 patients out of 208 were admitted overnight following their I&D even though they were identified initially as suitable to be treated via the ambulatory day case abscess pathway. 5 (11%) of these patients required IV antibiotics post-operatively, 2 (4%) had documented medical reasons that required an overnight admission, 13 (29%) had I&Ds in the evening and returned from theatre late. The remaining 25 (56%) had no documented reason, although 13 of these patients had their I&D after 5pm.

The majority of patients were under the age of 60 (83%) and had either pilonidal or perianal abscesses (49%). A full breakdown of pathologies is shown below in Figure 3.

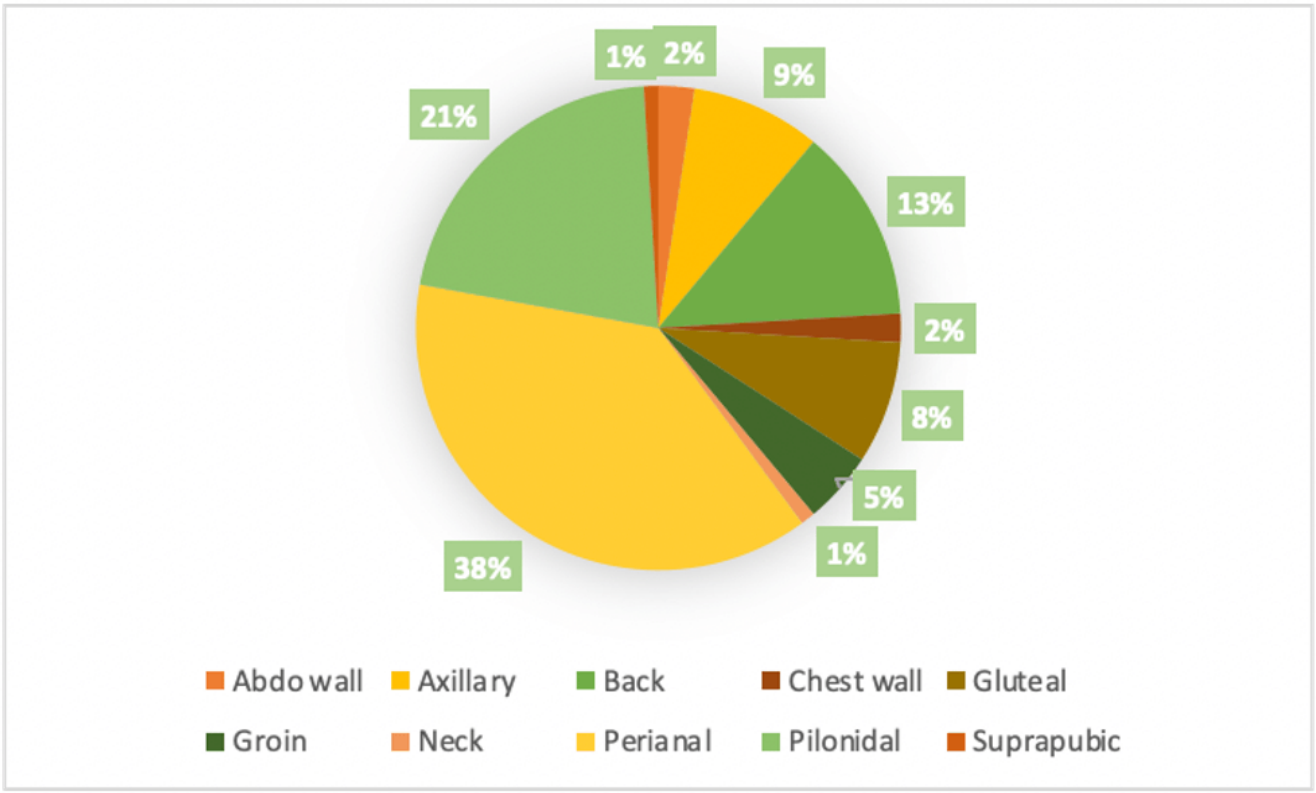

Figure 3: Distribution of abscess sites in Phase 3 results.

Figure 3.

Table 2 shows a summary of the waiting times for patients in all three phases of this study. Overall, we can see that phase 1 had only 56% of patients undergoing surgery in under 6 hours from admission. There was clear improvement after the implementation of the abscess pathway in phase 2, however, phase 3 shows that this has dropped to 66% compliance. The reasons for this will be explored later in this study.

Waiting times <6 hours		
Phase 1 (n=87)	49	56%
Phase 2 (n=32)	25	78%
Phase 3 (n=208)	137	66%

Table 2. *Table 2: Summary of waiting time <6 hours in each phase*

Discussion

Incision and drainage of superficial abscesses can be effectively managed as day case surgery, as recommended by BADS. Many hospitals both in the UK and abroad, have implemented day case abscess pathways successfully (7, 8).

Our results have shown that the majority of patients treated on the abscess pathway were taken to theatre for their I&D on the same day as presentation. When there were significant clinical

pressures preventing same day drainage, patients were sent home and returned on another day. This ensured there was financial benefit for the trust as it avoided unnecessary admissions and allowed for the patient to be cancelled in a timely manner, preventing them from long waiting times and allowing them to eat and drink. The cost of an NHS bed for 1 night has been estimated to be around £395 (10). The total cost for the 146 nights' that were saved by utilising the abscess pathway in phase 3 was £57,670. This is a significant reduction in costs that would otherwise be inevitable without the ambulatory pathway. This shows that having day case ambulatory pathways for abscesses is beneficial for both the patient and for the trust financially.

A proportion of our dataset required overnight admission, with one preventable reason being late surgery. Depending on the operative findings or progression of disease by the time of surgery, the decision to admit may be necessary and is down to the surgeon's discretion. If using £395 for the cost of 1 bed overnight, 45 patients requiring in total 59 nights' stay amounts to £23,305. 13 of these patients had late I&Ds leading to an overnight admission (and the reason for this being stated as returning from theatre late), that is an extra £5,135 that could have been saved. This indicates that we should consider the implementation of a cut off time for sending day case patients to theatre. This would prevent the unnecessary overnight admissions. Alternatively, later slots could be reserved for fit and well individuals who will still be discharged post operatively. Interestingly, age did not seem to have a correlation with those requiring a hospital stay.

COVID-19 has had a significant effect on secondary care. A direct effect of the pandemic has led to reluctance of patients to seek medical care due to long waiting lists and access difficulties, frequently leading to delayed presentation, worsening symptoms and increasing complications. A retrospective Swiss study showed that on average hospitals had a reduction of 31% when assessing the number of acute surgical presentations to their emergency departments during the pandemic (11). Due to the shift in prioritisation of resources that occurred at the height of the pandemic, a positive outcome has been the increased importance that has been placed on utilising day case pathways and reducing length of inpatient stay for patients (6). If given the option, the majority of patients would rather opt for day case over inpatient admission due to the reduced impact on their life. Therefore, day case pathways are beneficial as providing an efficient and streamlined service can improve confidence in patients regarding prompt decision making and management by healthcare professionals.

As a result of the pandemic on our district general hospital the abscess day-case dedicated theatre lists have been reutilised for other procedures due to service pressures. This includes other clinical conditions with perceived increased clinical priority (i.e., use of abscess pathway lists for 'hot' gallbladder cases). After the pandemic, it was felt that dedicating one theatre, three times a week, to the treatment of superficial abscesses was seen as poor theatre utilisation given the worsening NHS waiting lists (12).Therefore, a more reasonable approach, may be to share these dedicated lists and also utilise opportunities to add abscess cases onto the end of elective lists that finish early, which is what was done during phase 3. Effective implementation of this strategy involved good communication between theatres and managers, in order to maximise theatre utilisation. This requires ongoing education of both surgical and theatre staff to ensure that all can work cohesively to give our patients the very best care. Highlighting the benefits of a flexible abscess pathway will not only save the trust money, but will also reduce the patient burden on the emergency CEPOD list. Ultimately, this will lead to increased theatre productivity and increased patient satisfaction.

Limitations

There are several limitations to the data presented above. The re-audit in phase 2 had a very small sample size, therefore, this was repeated using a larger dataset in Phase 3 to ensure long term compliance with the pathway and reliable results. Waiting time of less than 6 hours were postulated by the department as this was felt to be a reasonable time-frame for non-life-threatening surgical cases to reach theatre.

Suitability for the ambulatory day case abscess pathway was not determined using strict criteria. It was down to the clinician's judgement for each individual case, however the only definite exclusions that were put in place for the pathway included medically unwell patients, diabetics, children, and immunocompromised patients. Appropriate patient selection is a key element to ensuring the success of a day case pathway and ensuring low rate of unexpected admissions. Two patients in phase 3 were admitted post-operatively for medical reasons, which may have been prevented by using stricter criteria for patient selection, which could include both medical and social factors. Social factors which should be considered prior to surgery include living situation, mobility, transport and availability of a responsible adult to stay with the patient overnight on the day of discharge. However, there is evidence to show that elderly patients, those with stable ASA grades and high BMI should not be excluded from being managed on a day case pathway (6).

According to BADS, high unplanned admission rates reflect the success of a day surgery pathway (6). It has been recommended that a target of less than 2% of patients is acceptable for unplanned admissions (6). However, in phase 3 of our study, 22% of patients were admitted post-operatively. There are several contributing factors that could have led to the rate of unexpected admissions. A preventable reason for overnight admission was late surgery time. To avoid this, it may be necessary to consider social issues and medical factors that may delay discharge in the pathway inclusion criteria therefore, ensuring that these patients are sent to theatre earlier in the day. Further work needs to be completed on this pathway which may include having a cut off time for sending to theatre and/or listing cancelled patients as 'golden' cases for the next day whilst major cases are being prepared for theatre. It has been shown that nursing staff may choose to admit patients rather than discharge them late at night (6). It is difficult to ascertain why this might be, but it could be due to the amount of paperwork involved, delays in completion of discharge summaries, or inexperience with discharging patients/lack of staff to provide training. For those that required admission due to clinical need for continued IV antibiotics, this was down to the surgeon's discretion, and may not be evidence based. However, if this is necessary and the patient is not clinically septic, another option could be to ambulate patients through SAU for IV antibiotics, therefore saving a hospital admission. Our results also show that for all patients on the day case pathway that required an overnight admission, there was not always a clear reason documented in the medical notes.

For the dedicated abscess pathway lists we need to ensure that there is strict criterion which is adhered to in order to ensure efficiency. This pathway is for patients who are medically stable and can be treated in a day-case setting. A set cut off time to send for the last patient should be agreed at the beginning of every list, this will help prevent patient dissatisfaction and reduce trust costs by preventing unnecessary overnight admissions. In addition, to aid this list there should be a streamlined nurse-led discharge pathway to allow patients to recover and go home a few hours post operatively.

Conclusion

This multi-cycle audit has shown that it is feasible to use a day case abscess pathway and long-term compliance is possible when the pathway is utilised effectively. However, there needs to be further education as well as infrastructure to allow this to be successful long term. Locally, our trust is aiming to continue allocating theatres for superficial abscess treatment, but we would benefit from stricter patient criteria and a more streamlined, nurse-led discharge process. Overall, as has been shown internationally, a day case abscess pathway improves patient satisfaction, reduces trust costs and ultimately leads to a better standard of care.

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