



Packing versus mushroom catheters following incision and drainage in anorectal abscess

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Abstract

Purpose Management of anorectal abscess is traditionally by incision and drainage with packing. This study assessed the use of mushroom catheters compared with packing of anorectal abscess after incision and drainage in adults. Placement of a mushroom catheter to allow ongoing drainage of the cavity may have advantages by eliminating the need for painful dressing changes.

Methods This was a retrospective observational study. Following ethical approval, a chart review of 167 patients treated for anorectal abscess with either packing or mushroom catheter at Cork University Hospital from 2010 to 2015 was performed. Treatment decision was based on individual surgeon preference. Outcome measures included recurrence and fistula development. Telephone follow-up was also performed to assess patient satisfaction and quality of life (EQ-5D-3L).

Results One hundred and twenty-nine patients were treated with incision and drainage with packing, and 38 patients were treated with mushroom catheter. There was no statistically significant difference in recurrence ($p = 0.691$) or fistula development ($p = 0.299$) between the groups. Twenty-three patients had Crohn's disease, 17 patients had diabetes and 66 patients were smokers. There was no statistically significant difference in recurrence or fistula development between the treatment groups in Crohn's ($p = 0.493$), diabetics ($p = 0.949$) and smokers ($p = 0.275$). On average, patients treated with mushroom catheter reported a statistically significant higher satisfaction score (9.2 ± 1.0) than patients treated with packing (7.6 ± 1.8 , $p = 0.013$).

Conclusion Mushroom catheter drainage of anorectal abscesses is a safe alternative to traditional packing and results in higher patient satisfaction. This study provides a rationale for a future randomised controlled trial.

Keywords Anorectal abscess · Incision and drainage · Mushroom catheter · Packing · Perianal abscess

Introduction

Anorectal abscess is a common problem and contributes significantly to the daily general surgical emergency workload [1, 2]. The aetiology is usually glandular infection arising from the anal crypts. Approximately one third of anorectal abscess are associated with fistula-in-ano either from the outset or as a later manifestation. Underlying conditions such as Crohn's disease, diabetes and obesity are associated with an increased risk of anorectal abscess [2].

Traditional surgical management consists of incision and drainage (I&D) of the abscess, followed by post-operative packing. This usually involves either iodine-based or calcium alginate dressing changes in the community once the patient is discharged from hospital. However, several studies have highlighted that post-operative dressing changes are a significant use of resources, and furthermore may be uncomfortable and inconvenient for patients [3, 4]. Yeung et al. [3] conducted a survey of community nurses and found there was a wide disparity in the practice of dressings in this setting.

In view of the resource implications and patient comfort, several authors have questioned whether routine packing of anorectal abscesses is truly necessary. There have been several studies comparing drainage without packing to drainage with packing. Tonkin et al. [5] found no difference in fistula formation or recurrence in patients who underwent packing compared with no packing. Similarly, Pearce et al. [4] recently conducted a multicentre collaborative study that showed that recurrent abscess formation is relatively rare and that packing

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is painful and costly. A 2016 Cochrane review concluded that it is unclear whether using internal dressings for anorectal abscess cavities is of benefit, but that there is a need for further research [6, 7]. However, the Cochrane review only included two studies, due to a paucity of high-quality literature examining the question of whether dressings in anorectal abscess are of benefit.

The major concern with anorectal abscess is the risk of recurrent perianal sepsis [8]. Early recurrence is usually associated with surgical failure [9]. One concern in not packing anorectal abscesses is that this may allow closure of the superficial part of the cavity before the cavity has adequately drained, and may lead to recurrent anorectal abscess formation. Furthermore, this could be associated with fistula formation. To avoid recurrent abscess formation, leaving a drain in situ has been described as an alternative to traditional incision and drainage with packing [10–15]. Beck et al. [10] reported in 1988 that mushroom catheter drainage for treating anorectal abscesses can achieve healing with low morbidity and significant cost savings. However, there has not been a subsequent large trial to confirm these findings. Pritchard et al. [16] found that catheter drainage resulted in lower recurrence than incision and drainage in the treatment of perirectal disease in Crohn's patients. However, the study's sample size was limited ($n = 38$) and its applicability to the general population is unknown. More recently, Hasan [17] reported the use of a corrugated rubber drain. Pang et al. [18] examined the use of a vacuum drainage system following incision and drainage of a perianal abscess.

This study aimed to compare mushroom catheter drainage versus packing of anorectal abscesses after incision and drainage in adults. The primary outcome of interest was recurrence and fistula formation. The secondary outcome of interest was patient satisfaction and quality of life. If outcomes were equivalent or superior in the mushroom catheter group in this retrospective study, this could provide a rationale for a future randomised controlled trial.

Methods

Ethics approval was obtained from Clinical Research Ethics Committee of the Cork Teaching Hospital (CREC). A retrospective cohort study was conducted of all patients who underwent surgical intervention for anorectal abscesses at Cork University Hospital, Ireland, between 2010 and 2015. Data were collected in compliance with Data Protection Law and Principles. In our institution, four surgeons utilised mushroom catheters while others mainly utilised traditional packing to manage anorectal abscess. In view of the differences in routine management, this allowed the opportunity to retrospectively evaluate differences in outcomes between the two approaches.

Inclusion criteria were patients aged 18 years and above who underwent surgical intervention for anorectal abscess once or on multiple occasions with either incision and drainage with packing or mushroom catheter insertion. Exclusion criteria were patients under 18 years of age or treated outside of this time frame in a different hospital. For the purposes of data analysis, patients were compared between two groups—those who underwent mushroom catheter drainage versus those that underwent incision and drainage with packing of anorectal abscess. Treatment decision was based solely on the surgeon's preference and usual practice. Patient demographics of both groups were recorded. The size of catheter was not recorded, but clinical practice was to use a 12–14 French catheter mushroom catheter as standard. The specific type of anorectal abscess was not recorded due to the retrospective nature of the study and the lack of reliable data in operation notes distinguishing types of perianal abscess. The mushroom catheter was sutured in place with a 3.0 silk suture. After 3–5 days, the silk suture was removed in OPD and the catheter was shortened to a comfortable length. Catheters were removed in OPD by gentle traction after approximately 1 week and did not require a second trip to theatre. The duration of each catheter was not possible to ascertain from the retrospective chart review. Outcome measures collected on chart review included the treatment received, the number of interventions and post-operative sequelae including recurrence and fistula development, as well as significant risk factors (smoking status, diabetes and inflammatory bowel disease). There was insufficient data on chart review to allow a direct comparison in healing times between traditional packing and mushroom catheter insertion.

Patients were subsequently followed up with a telephone interview to assess their treatment satisfaction and quality of life. For those who consented to telephone follow-up, treatment satisfaction was assessed with a 10-point scale (where 1 was least satisfied, and 10 was most satisfied). Quality of life was assessed using the standardised, internationally validated EuroQoL EQ5D3L questionnaire [19]. The questionnaire reports dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety/depression, with a 3-point scale (where 1 was no impact, and 3 was severely impacted), and the patient's current health status with a 10-point scale (where 1 was the worst and 10 was the best imaginable health status).

Statistical analysis

Results were analysed using SPSS v.22 (Armonk, NY, USA). Rates of recurrence were assessed using chi-square test. Baseline variables and quality of life metrics were compared between the two groups by independent *t* tests. A value of $p < 0.05$ was considered statistically significant.

Results

Between January 2010 and December 2015, a total of 167 adult patients were treated for anorectal abscess at Cork University Hospital. Patients ranged in age from 18 to 78 years (mean, 42 years). One hundred and twenty-nine patients (77%) were treated with incision and drainage with packing, and 38 patients (23%) were treated with incision and drainage with mushroom catheter (Table 1). There was no statistical difference between the group demographics. No catheter fell out spontaneously during the study period and none was lost in the abscess cavity.

Recurrence rates

Recurrence of abscess or development of a fistula was not significantly different between patients treated with incision and drainage with packing versus mushroom catheter drainage of anorectal abscess (Table 2). Recurrence of abscess was 19% with packing, and 16% with catheter drainage ($p = 0.691$). Development of a fistula was 19% with packing, and 26% with catheter drainage ($p = 0.299$).

Time to abscess recurrence or fistula development was not significantly different between patients treated with incision and drainage with packing (492 days) versus mushroom catheter drainage (304 days) of anorectal abscess ($p = 0.200$).

Follow-up

Adequate follow-up was obtainable in 80% of patients ($N = 133$). Average follow-up time was 264 days for patients treated with incision and drainage with packing, and 246 days in patients treated with mushroom catheter. About 31% of patients were followed up for 2 weeks post-surgery. About 21% of patients required follow-up for 1 year or longer.

Table 1 Demographics

	I&D with packing	I&D with catheter	<i>p</i> value
No. of cases (<i>n</i> , %)	129 (77%)	38 (23%)	
Age (mean)	41.8 years	41.5 years	$p = 0.981$
Sex			
Male (<i>n</i> , %)	89 (69%)	23(61%)	$p = 0.332$
Female (<i>n</i> , %)	40 (31%)	15 (39%)	$p = 0.332$
Type of case			
Abscess only (<i>n</i> , %)	110 (85%)	28 (74%)	$p = 0.148$
Fistula (<i>n</i> , %)	19 (15%)	10 (26%)	$p = 0.148$
Patients with risk factors			
Crohn's (<i>n</i> , %)	16 (12%)	7 (18%)	$p = 0.347$
Diabetes (<i>n</i> , %)	12 (9%)	5 (13%)	$p = 0.493$
Smoking (<i>n</i> , %)	51 (40%)	15 (39%)	$p = 0.374$

Risk factors

At the time of surgery, 23 patients had Crohn's disease. The rate of abscess recurrence or fistula development was not statistically different between those treated with incision and drainage with packing versus mushroom catheter drainage ($p = 0.493$).

At the time of surgery, 17 patients had diabetes. The rate of abscess recurrence or fistula development was not statistically different between those treated with incision and drainage with packing versus mushroom catheter drainage ($p = 0.949$).

At the time of surgery, 66 patients had a positive smoking history. The rate of abscess recurrence or fistula development was not statistically different between those treated with incision and drainage with packing versus mushroom catheter drainage ($p = 0.275$) (Table 3).

Quality of life

Quality of life metrics using EuroQoL were available from 25% of patients ($n = 41$; Table 4). On average, patients treated with mushroom catheter reported a statistically significant lower state of health (5.9 ± 2.0) than patients treatment with incision and drainage (7.4 ± 1.4), $t(39) = 2.5$, $p = 0.017$. There were no statistical differences in mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

On average, patients treated with mushroom catheter reported a statistically significant higher satisfaction score (9.2 ± 1.0) than patients treated with incision and drainage with packing (7.6 ± 1.8), $t(39) = 2.6$, $p = 0.013$.

Limitations

This study is limited by its retrospective nature. This meant some information, e.g. the type of anorectal abscess, the duration of the mushroom catheter and the size of the mushroom catheter was not available. Patients were contacted for quality of life data after a significant time period since their abscess, and only 25% completed quality of life data. Costings were not calculated prospectively, limiting analysis of the data. Although these are significant limiting factors, the data provides a useful pilot to form the basis of a future randomised controlled trial and does provide at least preliminary data on the safety of this approach, which is supported by other similar studies in the literature [4, 5, 20, 21].

Discussion

Traditional packing of the anorectal abscess wound cavity is painful and uses significant hospital and community resources [3, 4]. There are potential advantages to an alternative to packing, including reduced pain, improved quality of life and return to

Table 2 Surgical outcomes

	I&D with packing	I&D with catheter	<i>p</i> value
Recurrence of abscess (<i>n</i> , %)	24 (19%)	6 (16%)	<i>p</i> = 0.691
Development of fistula (<i>n</i> , %)	24 (19%)	10 (26%)	<i>p</i> = 0.299
Time to recurrence	492 days	304 days	<i>p</i> = 0.200

daily activities, and cost savings. However, the concern is that alternatives to the tried and tested method of packing may result in higher complication rates. Given that packing may be associated with significant patient discomfort and is resource-heavy, alternative approaches should be considered. This has already been established in breast surgery, where image-guided aspiration is now standard for breast abscesses [22]. However, there is no data on image-guided aspiration in perianal abscess. Although not as minimally invasive as aspiration, this study examined an alternative less-invasive approach. This study examined patients treated with traditional packing versus mushroom catheter drainage to assess whether there was a higher complication and recurrence rate in those treated with a mushroom catheter, and to examine whether there were any improvements in quality of life. This study demonstrated that recurrence rates are comparable, even in high-risk Crohn's patients [23]. This suggests that the use of mushroom drainage is a safe alternative to the traditional packing of anorectal abscess following incision and drainage.

Quality of life, as reflected by EQ-5D, was comparable in dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety/depression between the two groups. EQ-5D is a validated assessment tool for assessing the quality of life in surgical trials [19]. Preoperative or baseline scores were not taken as part of this study, so conclusions cannot be drawn about the effect of the abscess or the procedure on the patient's quality of life. However, there was a markedly higher patient satisfaction in patients treated with mushroom drainage than those treated with incision and drainage with packing of the abscess.

Another advantage of mushroom catheters, although not specifically looked at in this study, is cost savings. Pearce et al. [4] estimated in 2016 that packing of abscess costs the

Table 4 Quality of life

	I&D with packing	I&D with catheter	<i>p</i> value
Satisfaction score (1–10)	7.6 ± 1.8	9.2 ± 1.0	<i>p</i> = 0.013
Mobility (1–3)	1.2 ± 0.5	1.7 ± 0.9	<i>p</i> = 0.166
Self-care (1–3)	1.3 ± 0.6	1.4 ± 0.7	<i>p</i> = 0.485
Usual activities (1–3)	1.3 ± 0.6	1.7 ± 0.9	<i>p</i> = 0.132
Pain/discomfort (1–3)	1.3 ± 0.6	1.7 ± 0.7	<i>p</i> = 0.186
Anxiety/depression (1–3)	1.2 ± 0.6	2 ± 1.0	<i>p</i> = 0.057
State of health (1–10)	7.4 ± 1.4	5.9 ± 2.0	<i>p</i> = 0.017

Values are given as mean ± SD

NHS €6,453,360 per annum in England, based on 18,000 patients per year. If we extrapolate this and assume that the population in Ireland is approximately 10% of the population in England, the use of a mushroom catheter may be associated with cost savings of approximately €645,336 per annum for HSE Ireland. Many patients with perianal abscess are currently treated overnight in hospital [24]. Indeed, patients often stay in hospital until they have tolerated their first dressing change. There is potential for significant cost savings by converting inpatient stay for perianal abscess to a day case procedure. Use of a mushroom catheter rather than dressings could potentially be helpful in converting anorectal abscess surgery from routinely being an overnight admission to a day case, or at least reducing length of stay. Furthermore, as anorectal abscess often affects young patients, the need for frequent dressing changes can interfere with a patient's ability to go back to work. Further study is needed to calculate the exact resource and cost savings comparing mushroom catheter with dressings.

Many strategies to reduce the risk of recurrence following perianal abscess drainage have been tried, including management of underlying fistulae and use of antibiotics [7, 25]. While fistula management can reduce recurrence, the use of antibiotics routinely post abscess drainage is not supported in the literature. As discussed above, the use of packing is traditional empiric strategy, and it is unknown whether it is necessary to reduce the risk of recurrence. A Cochrane review

Table 3 Effect of risk factors on surgical outcome

	Crohn's disease	Diabetes	Smoking
Cases (<i>n</i>)	23	17	66
Abscess recurrence or fistula development (<i>n</i> , %)	14 (61%)	7 (41%)	19 (29%)
I&D with packing (<i>n</i> , %)	9 (39%)	5 (29%)	13 (20%)
I&D with catheter (<i>n</i> , %)	5 (22%)	2 (12%)	6 (9%)
<i>p</i> value	<i>p</i> = 0.493	<i>p</i> = 0.949	<i>p</i> = 0.275

concluded that there was no high-level evidence to support or refute the use of packing [6]. Several studies have suggested that non-packing alone is a safe option [4, 5, 20, 21]. However, as discussed above, the theoretical concern with simply omitting packing is that the superficial part of the cavity could heal before the deeper cavity, predisposing to recurrent abscess and perineal sepsis. Pearce et al. plan to study this further in a randomised controlled trial. However, the mushroom catheter may provide a safer option by keeping the cavity open for longer to heal from inside out rather than simply not packing the cavity. Indeed, Millan et al. [26] used a selective approach with a mushroom catheter used for higher intersphincteric abscess. Limitations of the present study as mentioned include the retrospective design, the lack of pre-procedure quality of life scores and the lack of randomisation between treatment groups. However, the data from this retrospective observational study suggests that mushroom catheter drainage is a safe and effective treatment and associated with higher patient satisfaction scores than traditional packing. Our study thus provides a rationale for design of a randomised controlled trial to compare mushroom catheter drainage with incision and drainage with dressings for anorectal abscess.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval Ethics approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospital (CREC). This was a retrospective chart review with telephone follow-up of patients following informed consent. This article does not contain any studies with human participants performed by any of the authors as the only interventions performed were as part of routine care and not altered by the study.

Informed consent Informed consent was obtained from all individual participants who participated in telephone follow-up included in the study.

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