

Clinical Study

Limited Incision-and-Drainage versus Conservative Management of Perianal Abscess in Infants

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Keywords

Anal pathology
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Perineal abscess
Multi-drug resistant bacteria
Non-operative treatment
Surgical drainage of pus

Abbreviations

CI - Confidence intervals
CM - Conservative management
ID - Incision and drainage
LID - Limited ID
MDR - Multi-drug resistance
OR - Odds ratio
PA - Perianal abscess

Abstract

Introduction: Perianal abscesses (PA) are common in infants, yet there is no consensus on optimal management. Approaches range from conservative management (CM) to surgical incision and drainage, with varying rates of recurrence and fistula formation. A significant challenge is the absence of both standardized definitions and a protocol driven approach to incision-and-drainage. This study aims to evaluate the outcomes of standardized limited incision-and-drainage (LID) and CM approaches in infantile perianal abscesses.

Methods: This retrospective observational cohort study included infants less than 18 months of age who were treated for perianal abscess at a single pediatric surgical unit between August 2019 and August 2023. Patients who had been treated either with LID or CM protocols were compared. The primary outcomes were recurrence and fistula rates, while secondary outcomes included identifying potential risk factors for these complications.

Results: A total of 61 abscesses in 51 infants were analyzed. No significant differences were found between LID and CM groups in terms of recurrence (33% vs. 29%, $p=0.94$) or fistula formation (30% vs. 25%, $p=0.64$). Bacterial cultures revealed antibiotic-resistant bacteria in 36% of cases, with resistant strains significantly associated with both recurrence (OR 9.28, $p=0.0006$) and fistula development (OR 5.00, $p=0.010$).

Conclusions: LID and CM protocols yield comparable outcomes in terms of recurrence and fistula formation in infants with PA. The strong association between antibiotic-resistant bacteria and these complications underscores the importance of early identification and targeted antimicrobial treatment. Further research is needed to refine antibiotic use and assess long-term outcomes.

INTRODUCTION

Perianal abscess (PA) is localized collection of pus that commonly arises from infection within abnormally deep anal crypts of Morgagni. It is particularly common in infants and young children less than 12 months of age.⁽¹⁻⁴⁾ They typically present as tender, fluctuant masses in the perianal region, often at the 3 o'clock and 9 o'clock positions. A perianal fistula results when an abscess ruptures, forming a tract connecting the infected anal crypt to the skin surface. Persistent mucous and/or fecal discharge may occur through the fistula.⁽¹⁻³⁾

The optimal management of PA remains a subject of debate. It includes topical therapy, systemic antibiotics and conservative management (CM), incision-and-drainage (ID) or a composite approach. Reported recurrence rate varies between 12% and 26%, while progression to perineal fistula has been reported in 20% to 85% of cases.⁽⁴⁻⁷⁾

Another contentious issue is the progression of PA into perianal fistula, which is reported to occur in 20% to 85% of cases.⁽⁴⁻¹²⁾ Some studies have suggested that CM is less likely to result in fistula formation, while others have reported reduced fistula rates when ID is combined with antibiotics.⁽⁴⁾ However, there are no consensus on the optimal management of PA.⁽⁶⁻¹²⁾ This may be attributed to the absence of standardized treatment protocols.

This study aims to address these knowledge gaps by comparing the outcomes of a standardized protocol of limited incision-and-drainage (LID) and CM. The primary aim of this study is to compare the risks of recurrence and fistula formation between the limited ID and CM groups. The secondary aim is to identify potential factors that influence fistula formation and recurrent PA.

METHODS

This study presents a retrospective cohort of all infants less than 18 months of age, referred for PA

between 1st August 2019 and 31st August 2023. Infants with gluteal abscesses located far away from the perianal creases, or those who had received prior treatment, were excluded. Calculation of statistical power was not feasible due to the retrospective nature of the study and a small sample size.

At the pediatric surgery unit of the Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital, LID and CM approaches to PA had been standardized prior to this study. All the doctors strictly adhered to one of these two protocols, preventing deviations that could introduce bias or compromise data reliability for subsequent audits and analysis. Hospital protocol necessitated only these two approaches to be followed, and prevented any modifications that could skew comparisons.

The LID procedure was performed under aseptic conditions by applying topical anesthetic cream or ethyl chloride spray. The most fluctuant part of the abscess was incised, evacuating pus, obtaining swab samples for microbiology, and applying a compression dressing. No de-septation, packing or other instrumentation were used. Parents were instructed to frequently change diapers, clean the incision site, and apply compression to facilitate further drainage. Oral amoxicillin-clavulanic acid was prescribed for one week. A follow-up was conducted one-week post-procedure and alternate antibiotics were prescribed if microbial cultures reveal resistance to amoxicillin or if induration and purulent discharge continued.

In CM strategy, oral amoxicillin-clavulanic acid was prescribed for one week, with a follow-up appointment scheduled upon completion of the course. In case of spontaneous rupture on presentation, swabs were obtained from the abscess site; for those ruptured at home, swabs were taken during follow-up if residual pus was present.

The use of amoxicillin-clavulanic acid as the initial antibiotic of choice in both the groups was determined by the institution's infection control committee, on the basis of local antibiograms and antibiotic stewardship policies. Weekly follow-ups were continued until all the symptoms resolve. Subsequently, patients were reviewed twice at 3 and 6 months respectively. Pediatric surgical hot-line number was provided to parents, facilitating earlier appointments if lesions recurred. A perianal fistula was defined as the continuation of a PA, characterized by an open drainage site discharging mucus or stool daily.

Data collected for analysis include patient age, sex, abscess location, perianal fistula, recurrence, type of bacterial isolate, presence of multi-drug resistant (MDR) bacteria and duration of follow-up. Patients were divided into two groups based on the nature of treatment given: LID versus CM. Data analysis was done using Statistical Package for Social Sciences (SPSS) software (ver. 29). Student t-test was used to compare continuous variables, and chi-square test for categorical parameters. Statistical significance was set at a P-value of 0.05 or less.

RESULTS

A total of 61 abscesses in 51 infants were included in the study. A male predominance (n=48) was noted. The median age at presentation was 6 months and the mean follow-up was 9 months.

Majority of the abscesses were located at either the 3 o'clock (56%) or 9 o'clock (36%) positions, with the remaining 8% occurring at various other locations (1, 5, 7, and 12 o'clock). There was no statistically significant difference between the 3 and 9 o'clock positions in terms of progression to fistula formation (P=0.91). Notably, none of the three female patients presented with abscesses at the 3 or 9 o'clock positions; two had abscesses at 1 o'clock, and one at 12 o'clock positions.

Among them 33 abscesses (54%) were managed with LID, while the remaining 28 (46%) were treated with CM. Age, sex, abscess site, bacterial isolate, bacterial resistance pattern and follow-up period did not differ significantly between the two groups. (Table 1)

Table 1. Outcome of Perianal Abscess

Variables	LID (n=33)	CM (n=28)	P Value
Age (months)*	6.04 (1-17 m)	5.5 (1-18 m)	0.25
Sex			
Male	31	27	0.20
Female	2	1	
Location of lesion			
3 O'clock	21	13	0.46
9 O'clock	10	12	
Others	2	3	
Bacterial Isolates			
Escherichia coli	13	12	0.25
Klebsiella	13	6	
Mixed flora	6	6	
Not available	1	4	
Drug resistant isolates	9	11	0.86
Recurrence†	11 (33%)	8 (29%)	0.94
Fistula†	10 (30%)	7 (25%)	0.64
Follow-up (months)*	9 (6-16 m)	8 (6-14 m)	0.59

* Values as median (range); † values as numbers (%)
CM - Conservative management; LID - Limited incision-and-drainage

The perianal fistula complicated 30% of patients treated with LID and 25% of those treated with CM. However, this difference was not statistically significant (P=0.64). Similarly, recurrence was observed in 33% of patients treated with LID and in 29% of those treated with CM, with no statistically significant difference between the two groups (P=0.94).

Bacterial cultures isolated *Escherichia coli* in 25 cases (41%), *Klebsiella* species in 19 cases (31%)

and mixed flora in 12 cases (20%). No culture reports were available in 5 cases (8%). Among the isolated bacteria, 20 out of the 56 isolates (36%) exhibited multi-drug resistance. Notably, just over two-thirds of the recurrent cases involved resistant bacteria, a difference that was statistically significant ($P=0.007$). The odds ratio (OR) of recurrence with resistant bacteria was 9.28 (95% CI: 2.60 to 33.06, $P=0.0006$). In this context, 10 out of the 17 fistulas (59%) were associated with resistant bacteria, which was statistically significant ($P=0.002$). The OR for fistula development in the presence of resistant bacteria was 5.00 (95% CI: 1.44 to 17.27, $P=0.010$).

Recurrence was observed in 19 abscesses (31%), of which 10 (53%) progressed into fistula. (Fig 1) Among the 42 abscesses without recurrence, only 17% had fistula. This was statistically significant ($P=0.03$), with an odds ratio (OR) of 5.55 (95% CI: 1.65 to 18.67, $P=0.005$) for fistula formation in recurrent PA. Notably, all the recurrences occurred within the first 3 months of initial presentation, except for one case that recurred after 6 months.

DISCUSSION

Anatomical abnormalities of the anal glands or crypts, combined with infection, are widely held as the key factors in the pathogenesis of (PA) in infants.^(1,2) Male predominance in PA is well documented, with some studies reporting exclusively male patients. This may be explained by the influence of androgens on anal glands.⁽⁴⁾ In our series, the female-to-male ratio was approximately 1:20. Interestingly, females often presented with lesions in atypical locations (other than the typical 3- and 9- o'clock positions), suggesting the possibility of a different pathogenic mechanism.

The ideal management of PA in infants remains contentious. Although some studies^(13,14) advocate CM, it is not universally accepted.^(14,15) Lower rates of recurrence and fistula formation with CM have been documented^(12,16,17) as compared to that of

ID. According to some authors combining ID with systemic antibiotics reduces the risk of fistula.⁽⁴⁾

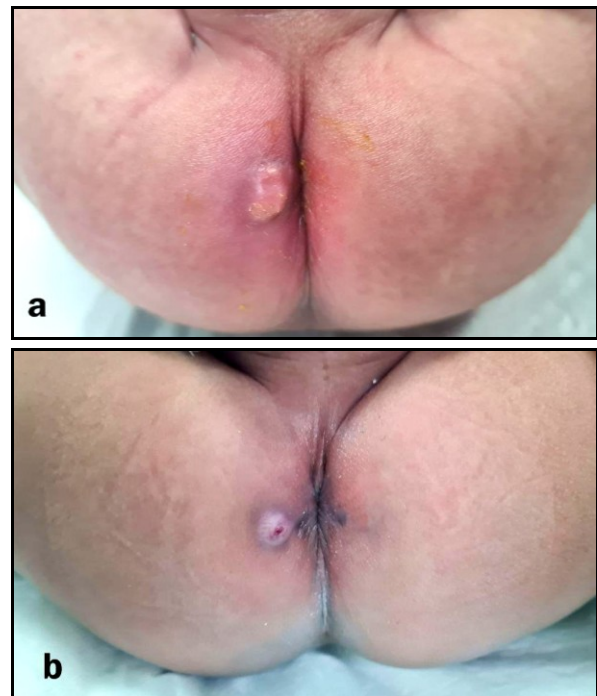


Fig 1. Perianal abscess at 9' o'clock location. (a) Abscess drained by limited incision; (b) Same patient complicated with fistula.

The conflicting rates of complications noted in the literature appear to be due to lack of standardized protocols. In contrast to this our hospital protocol is well standardized for both LID and CM, thereby enabling a more precise comparison of outcomes. The well-matched cohort of the two groups in our study strengthens the validity of our findings.

We noticed no significant difference between LID and CM in terms of fistula formation or recurrence rates. This observation disproves the claims of superiority of one method over the other in preventing complications. Absence of clear advantage of any one method of treatment allows greater flexibility in therapeutic decision-making by incorporating patient comfort, resource availability and parental preferences. However, it is important to note that both modalities of treatment were associated with significant rates of fistula (28%)

and recurrence (31%), highlighting the need for further research on more effective prevention.

Our data suggest a strong association between multidrug-resistant bacteria and complications such as abscess recurrence and fistula formation. More than two-thirds of recurrent abscesses were due to antibiotic-resistant bacteria, with the odds of recurrence being over nine times higher in these cases compared to those due to non-resistant bacteria (OR 9.28, 95% CI: 2.60-33.06). Additionally, the presence of resistant bacteria significantly increased the risk of fistula development, with a fivefold increase in odds (OR 5.00, 95% CI: 1.44-17.27). Our data also suggest that abscess recurrence itself is a significant predictor of fistula formation. Recurring abscesses were five times more likely to evolve into fistulas as compared to those that did not recur (OR 5.55, 95% CI: 1.65-18.67). These findings are of predictive value.

The combination of bacterial resistance and lesion recurrence suggests a potential synergism in the fistula formation. These findings underscore the importance of promptly identifying resistant bacteria and implementing targeted anti-microbial therapy to reduce the risk of complications.

LIMITATIONS

This study has several limitations. First, the benefits of upfront antibiotic therapy with amoxicillin-clavulanic acid remain uncertain in cases without resistant bacteria. This underscores the need for further research to determine if antibiotics should be prescribed more selectively based on bacterial resistance patterns.

Second, although efforts were made to standardize treatment protocols, variations in the timing of culture may have influenced the detection of resistant bacteria, potentially introducing bias.

Third, despite standardized protocols controlling confounders, retrospective studies carry inherent

selection bias. A double-blinded randomized controlled trial remains the gold standard for validation.

Finally, differences in the pattern of local bacterial flora, antibiotic stewardship practices, and health-care access may limit the generalizability of our results to other settings.

CONCLUSION

This study compared the outcomes of LID versus CM in infants with PA. Both approaches had comparable rates of recurrence and fistula formation, suggesting that neither strategy is superior in preventing these complications. Isolation of antibiotic-resistant bacteria was strongly associated with more complications, highlighting the need for early identification of pathogenic organism and targeted antimicrobial treatment.

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