

Original article

Bacteriological profile of surgical site infection following posterior sagittal repair in children with anorectal malformation

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Abstract

Introduction: Posterior sagittal anorectoplasty (PSARP) is the most commonly performed operation in children with anorectal malformation and provides the best chances of continence. However surgical site infection of the PSARP wound may cause significant morbidity in these patients and may affect the outcome. The aim of this study is to find the incidence of surgical site infection following posterior sagittal repair and to identify the bacteriological profile and their antimicrobial susceptibility.

Material and Methods: All the patient who underwent definitive repair of the malformation through posterior sagittal route were included in the study. Samples from the patients where there was clinical suspicion of PSARP wound infection were collected using sterile cotton swabs sent to microbiology laboratory. Bacteriological culture identification and antibiotic sensitivity was done following standard microbiological techniques.

Results: Nineteen patients were identified where pus culture was positive for some bacteria. There were 14 females and 5 males. There was high incidence of PSARP wound infection in rectovestibular fistula and in children where diverting colostomy was done instead of divided colostomy. The most commonly identified bacterium was *E. coli* followed by *S. epidermidis*.

Conclusion: Wound infection of the posterior sagittal incision is otherwise uncommon in the postoperative period. It is more common in girls with rectovestibular fistula and in the presence of a loop colostomy. Appropriate infection control measures and a sensible and judicious use of antibiotic in perioperative period may further reduce surgical site infections in PSARP.

Introduction

The incidence of anorectal malformation ranges from 1 in 1500 to 5,000 per live births. Since the introduction of Posterior sagittal anorectoplasty (PSARP) by Pena it has become the gold standard treatment of anorectal malformation^{1,2}. However it is a technically difficult operation and requires meticulous and fine operative skills to attain effective outcomes. Besides other aspects, the postoperative care of the wound determines the ultimate outcome in these children^{2,3}. The morbidity and mortality following PSARP is mainly related to associated life threatening malformations. These include cardiac anomalies, CNS malformations, associated alimentary tract atresias, infections and the birth weight.

Early complications following PSARP are rare and not usually troublesome. Surgical site infection of the posterior sagittal wound is usually very uncommon⁴. Various authors have reported that it is more common in children who have loop colostomy leading to incomplete diversion^{5,6}. Type of anomaly is also reported to be a determinant of postoperative wound infection. Surgical skills and inexperience and lack of tissue respect may also contribute to the complications⁴. Depending upon the depth of infection the ultimate outcome may be

affected in these children. However most of the infections are superficial and heal without any long term complications^{2,3,6}.

Since postoperative complications are identified to escalate the morbidity and mortality leading to increased patient misery and consumption of health care resources especially in health scarce nations like ours, therefore control of preventable postoperative complications like wound infection can help prevent long hospital stay and the need for additional interventional procedures⁷. Since there is scarcity of studies on incidence of surgical site infection following posterior sagittal repair of anorectal malformation, therefore this study was planned. The aim of this study was to evaluate the incidence of surgical site infection after PSARP, to assess possible risk factors, to identify the bacteriological profile of PSARP wound infection and their antimicrobial susceptibility.

Materials and Methods

All the patients of ARM treated through posterior sagittal route in the unit of paediatric surgery of our hospital were included in the study. Demographic data, type of colostomy, ARM subtype, single or three stage procedure, operative time were noted. Surgical site infection of the PSARP wound was suspected clinically based on serous or seropurulent discharge and with signs inflammation in postoperative period. Pus swabs were collected aseptically from each patient using sterile cotton swabs. The samples were sent to the microbiology lab. Bacteriological culture identification and antibiotic sensitivity was done following standard microbiological techniques.

Results

A total of 62 patients were assessed during the period. Out of these, 19 patients had evidence of PSARP surgical site infection where pus culture was positive for some bacteria. Among these patients there were 14 girls and 5 boys (Table 1). The mean age was 4.1 years. The most common subtype of ARM to be affected was rectovestibular fistula (n=9). The other subtypes to be affected were Rectourethral fistula (n=4), Perineal Fistula (n=2), Rectobladder fistula (n=2), No Fistula (n=2). Fifteen patients had loop colostomy while only one patient had divided colostomy. Only three patient underwent single stage repair (all were of rectovestibular fistula) while 16 underwent three stage procedure. The mean operative time in these 19 patients was 1 hour 45 minutes. Sixteen patients had superficial infection (skin involvement) while three had deep infection (subdermal tissue involvement). All the children had monomicrobial infections and the most common organism identified was *Escherichia coli* (n=11). The other organism were *Staphylococcus Epidermidis* (n=05), *Klebsiella species* (n=03). The patients were managed conservatively with cleaning with normal saline and dressing with topical antibiotic application. Intravenous antibiotics were administered for 5 days as per the culture sensitivity report.

Table 1: Comparison of children with and without PSARP surgical site infection.

Variables	Surgical site infection		P-value
	Present	Absent	
Number	19	43	0.06
Female	14	15	0.90
Male	05	28	0.045
Operative time (mean)(minutes)	115	105	0.07
Type of colostomy			
Loop colostomy	15	23	0.72
Divided colostomy	01	03	0.81
ARM Subtype			
Perineal Fistula	05	14	0.07
Rectourethral Fistula	05	15	0.06
Rectovestibular Fistula	07	10	0.07
Rectobladder Fistula	01	02	0.8
No Fistula	01	02	0.8
No. of stages			
Single stage procedure	03	17	0.067
Three stage procedure	16	26	0.69

Discussion

Surgical site infection following definitive repair by posterior sagittal route was seen in 30.6% of the cases assessed. The most common bacterium responsible was *Escherichia coli*. The bacteria isolated were *Staphylococcus Epidermidis* and *Klebsiella species*. Another important finding was that all the 19 patients had monomicrobial infection. The wound infection was significantly less in male babies and the values were statistically significant. This suggests that female babies are at more risk of PSARP surgical site infection. The results were statistically not significant with respect to operative time, ARM subtype, number of stages and type of colostomy cases. However as per the table 1 there definitely a trend which suggests that the rate of infection is more in children of loop colostomy and where it took longer operative time. This requires confirmation with a study having larger number of patients. The findings of our study vis-à-vis surgical site infection of PSARP wound comparable to studies by Karakus et al and Kumar et al. Wakhlu et al. reported 0.33% major wound disruption in 1206 patients of analysed rectovestibular fistula patients^{1,11}. Except for female gender our study didn't revealed any statistically significant risk factor for surgical site infection following PSARP. Menon and Rao reported only 0.7% mild infection of surgical site in 72 patients who underwent one-stage repair⁸.

There is consensus on use of intravenous perioperative antibiotics with 2-5 days antibiotics in postoperative period^{10,11}. However there is still debate on usage of topical antibiotics for management of wound infection.

The use of bowel preparation to prevent or minimize postoperative wound infection can be beneficial especially in cases where one-stage repair is contemplated¹².

The reason of initial diversion before definitive repair by most of the paediatric surgeons is nothing but to prevent faecal contamination and infection of PSARP wound. And this context since the loop colostomy provides incomplete diversion; theoretical advantage of divided colostomy has been given^{5,6}.

Conclusion

Thus surgical site wound infection after posterior sagittal repair is rare and found more commonly in female children. Although the management is straight forward, it is the prevention of these postoperative complications important as it may have long term implication in these children.

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