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Original Article

Inguinal herniotomy in children with and without peri-operative chemoprophylaxis

Rahman MM[1], Islam S[2], Huque MM[3]

Abstract

Purpose: The aim of the study is to find out any difference in the outcome regarding wound infection of inguinal herniotomy in children with and without peri-operative chemoprophylaxis.

Patients and Methods: This prospective interventional comparative study was conducted in the department of Paediatric Surgery, Dhaka Medical College Hospital from July, 2014 to June, 2016. Children (1 month to 12 years) with inguinal hernia attended in out patient department were included and children with other varieties like irreducible, obstructed, strangulated and infected inguinal hernias were excluded from the study. Patients were divided in Group A (Patient with peri-operative chemoprophylaxis) and Group B (Patient without peri-operative chemoprophylaxis). Ethical clearance was taken from the ethical review committee (ERC) of Dhaka Medical College. Local rise of temperature, redness, swelling, serous discharge in post-operative wounds, cost effectiveness, hypersensitivity reaction were compared between study groups.

Results: Total 100 patients were studied, 50 in each group. There was no significant difference between Group A and Group B regarding local rise of temperature (P =0.75), redness (P =0.75), swelling (P =0.75), serous discharge in wound (P =0.32) but highly significant (P<0.001) regarding cost of treatment in taka. There was no record of any hypersensitivity reaction during or following the treatment in any group.

Conclusions: This study revealed that peri-operative chemoprophylaxis is not superior to peri-operative without chemoprophylaxis in regards to local rise of temperature, redness, swelling, serous discharge in wound. It is concluded that the peri-operative chemoprophylaxis may not be necessary in clean surgery like inguinal herniotomy in children.

Keywords: Peri-operative chemoprophylaxis, inguinal herniotomy, clean wound, Children.

Introduction

Clean surgery has been defined as procedure where there is no break in the sterile technique and there is no entry into GIT, respiratory and genito-urinary tract[1]. Clean wound is an uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital or infected urinary tract is not entered. In addition, clean wounds are closed primarily and if necessary, drained with closed drainage[2].

The risk of post operative wound infection is lowest after clean surgical procedures[3, 4]. Some researchers demand that prophylactic systemic antibiotics are not indicated for most patients undergoing clean surgical operations[5]. This is more applicable in children because their immune system is more active against infection[6]. Majority of surgeons still use prophylactic antibiotics in these clean procedures because of undue fear of infection in their mind[7]. Less than 10^5 organisms/ml is unlikely to cause wound sepsis.[8]

1. Dr. Md. Mizanur Rahman, Junior Consultant, Department of Paediatric Surgery, Mugda Medical College Hospital, Dhaka-1000, Bangladesh.
2. Professor (c.c) Dr. Shahnoor Islam , Department of Paediatric Surgery, Dhaka Medical College Hospital, Dhaka-1000, Bangladesh.
3. Dr. Md. Moinul Huque, Associate Professor (cc), Department of Paediatric Urology, Dhaka Medical College Hospital, Dhaka-1000, Bangladesh.

Correspondence: Professor (cc) Dr. Shahnoor Islam, Unit Head, Department of Paediatric Surgery, Dhaka Medical College Hospital, Dhaka-1000, Bangladesh. Mobile: +8801714498128. E-mail: Islamshahnoor9@gmail.com

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A surgeon can either prevent or decrease the risk of post-operative wound infection by correcting the factors involved in the development of post-operative wound infection[9]. Infection in a clean operation is always due to exogenous bacteria[3]. In 10 years prospective study of 62936 clean surgery revealed that the rate of post operative wound infection without using peri-operative antibiotic in USA was less than 2%.

Peri-operative chemoprophylaxis is not only expensive to the patients but also can lead to hospital-acquired infections[10]. So our aim was to find out any difference in the outcome regarding wound infection of inguinal herniotomy in children with and without peri-operative chemoprophylaxis.

Patients and Methods

This was an interventional, randomized comparative study, conducted at the department of Paediatric Surgery, Dhaka Medical College and Hospital, Dhaka -1000, Bangladesh over a period of 24 months from July, 2014 to June, 2016. Children (1 month to 12 years) with inguinal hernia attended in outpatient department of Paediatric Surgery were included in this study. Children with irreducible, obstructed inguinal hernia, recurrent inguinal hernia, and strangulated inguinal hernia were excluded from the study.

The informed written consent from the parents or legal guardians was obtained in a preformed consent form. After inclusion, the patients were divided into two groups (according to their use of peri-operative chemoprophylaxis or not): Group A (Patient with peri-operativechemoprophylaxis) and Group B (patient without peri-operative chemoprophylaxis). Patient was prepared for surgical intervention as a day care basis. Routine investigations were performed in every child. All the necessary aseptic precautions were followed.

In Group A Injection Ceftriaxone (1gm/10ml) was given intravenously as a starting dose of 100 mg/kg/day, in single dose preoperatively, after induction and before incision. Then oral cefixime (8mg/kg/day in 2 divided doses) was advised from 24 hours postoperatively for 7 days. Group B (PWCP) did not get any peri-operative antibiotic.

The principle of surgery was followed in all cases, such as minimum tissue handling, maintaining of adequate homeostasis and minimum use of cautery. Inguinal herniotomy was done through lower inguinal crease line incision. Wounds were covered with adhesive dressing after closing of the wound by intradermal suture with polyglactin. Postoperatively, first dressing was changed on 3rd postoperative day usually. All patients were advised to come on 7th and 30th post-operative day for wound examination. In infected cases, serous discharge was sent for culture and sensitivity test and antibiotics were started according to culture and sensitivity report.

In each case, information about the patient was obtained in a pre-designed, semi-structured questionnaire.Ethical clearance was taken from the ethical review committee (ERC) of Dhaka Medical College. Data sheet includes: general questionnaire, clinical examination, investigations, and operative findings, follow up schedule. Local rise of temperature, redness, swelling and serous discharge in post-operative wounds, cost effectiveness, hypersensitivity reaction were compared between study groups.

Statistical analysis was performed using the Statistical Package for Social Science (SPSS) software, version 21 and expressed in tables. A descriptive analysis was performed for clinical features and results were presented as mean ± standard deviation, Chi-square (χ^2)-test for differences in proportion for (categorical variables) and unpaired Student's t-test for the differences in mean for (continuous variables). All values were two sided and considered as statistically significant if $p < 0.05$.

Results

Total 100 patients were studied, 50 in each group. The age of participants (Table I) was ranged from 1.5 month to 144 months. Mean age was 57 months and 58 months in group A and group B respectively.

Table-I

Age distribution of children (months) between two study groups

Age (months)	Group A (Patient with peri-operative chemoprophylaxis) n= 50	Group B (Patient without peri-operative chemoprophylaxis) n= 50	Total n= 100 (%)	P value
Range (months)	1.5-132	3-144	1.5-144	0.85
Median	48.0	54.0	48.0	
Mean ± SD	56.92 ± 34.23	58.32 ± 37.47	57.62± 35.7	

Out of seventy six of male 40 (80%) and 36 (72%) were in Group A and Group B respectively and out of 24 of female 10 (20%) and 14 (28%) were in Group A and Group B respectively. The difference in sex distribution between the study groups (Table II) was statistically not significant (P=0.35).

Local rise of temperature (Table III) was found in 2 (4%) patients and 3 (6%) on 3rd POD (postoperative day), 1 (2%) and 2 (4%) on 7th POD and none on 30th POD in both Group A and Group B respectively. P value was 0.75 (non-significant).

Redness (Table IV) was found in 2 (4%) and 3 (6%) on 3rd POD, 1 (2%) and 2 (4%) on 7th POD and none 30th POD in both Group A and Group B respectively. P value was 0.75, which was not significant.

Table-II
Sex distribution of children between two study groups

Sex	Group A (Patient with oeri-operative chemoprophylaxis) n = 50 (%)	Group B (Patient without peri-operative chemoprophylaxis) n = 50 (%)	Total n=100 (%)	P value
Male	40 (80%)	36 (72%)	76 (76%)	0.35
Female	10 (20%)	14 (28%)	24 (24%)	
Total	50 (100%)	50 (100%)	100 (100%)	

Table-III
Comparison of local rise of temperature in wound between two study groups

P O D	Local rise of temperature in wound	Group A (Patient with peri-operative chemoprophylaxis) n = 50 (%)	Group B (Patient without peri-operative chemoprophylaxis) n = 50 (%)	Total n=100 (%)	P value
3rd POD	Present	2 (4%)	3 (6%)	5 (5%)	0.75
	Absent	48(96%)	47 (94%)	95 (95%)	
7th POD	Present	1 (2%)	2 (4%)	3 (3%)	
	Absent	49(98%)	48 (96%)	97(97%)	
30th POD	Present	0 (0%)	0 (0%)	0 (0%)	
	Absent	50 (100%)	50(100%)	100(100%)	

Table IV
Comparison of redness in wound between two study groups

P O D	Redness in wound	Group A (Patient with peri-operative chemoprophylaxis) n = 50 (%)	Group B (Patient without peri-operative chemoprophylaxis) n = 50 (%)	Total n=100 (%)	P value
3rd POD	Present	2(4%)	3 (6%)	5 (5%)	0.75
	Absent	48(96%)	47 (94%)	95 (95%)	
7th POD	Present	1 (2%)	2 (4%)	3(3%)	
	Absent	49 (98%)	48 (96%)	97 (97%)	
30th POD	Present	0 (0%)	0 (0%)	0 (0%)	
	Absent	50 (100%)	50(100%)	100(100%)	

Swelling (Table V) was found in 2 (4%) and 3 (6%) on 3rd POD, 1 (2%) and 2 (4%) on 7th POD, and none on 30th POD in both Group A and Group B respectively. P value was 0.75, which was not significant.

Regarding serous discharge (Table VI), out of 50 patients, no patients had serous discharge in wound on 3rd, 7th, 30th postoperative day in group A. In case of group B, out of 50 patients, one (1%) patient had serous discharge in wound in 3rd POD and none had serous discharge in wound in 7th and 30th POD.

Serous discharge was sent for culture and sensitivity. There was no growth in culture and sensitivity report. The difference between both study groups was insignificant (P value 0.32). Costs of the treatment in both study groups were recorded (Table VII). The difference between both study groups was highly significant ($p<0.001$) as $t=18.49$. There was no hypersensitivity reaction during or following the treatment in any group.

Table V

Comparison of swelling in wound between two study groups

P O D	Swelling in wound	GroupA (Patient with peri-operative chemoprophylaxis) n = 50 (%)	Group B (Patient without peri-operative chemoprophylaxis) n = 50 (%)	Total n=100 (%)	P value
3rd POD	Present	2 (4%)	3 (6%)	5 (5%)	0.75
	Absent	48(96%)	47 (94%)	95(95%)	
7th POD	Present	1 (2%)	2 (4%)	3 (3%)	
	Absent	49(98%)	48 (96%)	97 (97%)	
30thPOD	Present	0 (0%)	0 (0%)	0(0%)	
	Absent	50 (100%)	50(100%)	100(100%)	

Table VI

Comparison of presence of serous discharge in wound between two study groups

P O D	Serous discharge in wound	Group A (Patient with peri-operative chemoprophylaxis) n = 50 (%)	Group B (Patient without peri-operative chemoprophylaxis) n = 50 (%)	Total n=100 (%)	P value
3rd POD	Present	0 (0%)	1 (2%)	1 (1%)	0.32
	Absent	50 (100%)	49 (98%)	99 (99%)	
7th POD	Present	0 (0%)	0 (0%)	0 (0%)	
	Absent	50 (100%)	50 (100%)	100(100%)	
30th POD	Present	0(0%)	0(0%)	0 (0%)	
	Absent	50 (100%)	50 (100%)	100(100%)	

Table VII

Comparison of cost of treatment (taka) between two study groups

Cost	Group A (Patient with peri-operative Chemoprophylaxis) n= 50	Group B (Patient without Peri-operative chemoprophylaxis) n = 50	P value
Mean ± SD	500.00 ± 150.47	100.00 ± 30.23	<0.001

Discussion

In this study, out of 100 patients with inguinal herniotomy, age of the participants ranged from 1.5 month to 12 years. According to Vaze et al[10]. age of participants ranged from 1-8 years. This observation of Vaze et al[10] was not similar with this study due to age variation.

Out of seventy six of male 40 (80%) and 36 (72%) were in Group A and Group B respectively and out of 24 of female 10 (20%) and 14 (28%) were in Group A and Group B respectively with male: female was 3.16:1. There was no significant difference between Group A and Group B regarding local rise of temperature (P=0.75), redness (P =0.75), swelling (P =0.75), serous discharge in wound (P =0.32) but highly significant (P 0.001) regarding cost of treatment in taka. There was no record of any hypersensitivity reaction during or following the treatment in any group. A study by Sajjad et al. (2005)[7] had similar results in their study.

A study of Hasan et al,[6] showed five patients (5%) with chemoprophylaxis developed post operative wound infection on 3rd POD. Three patients (3%) without chemoprophylaxis developed post operative wound infection on 3rd and 6th POD. In this study, in group A, out of 50 patients, none had serous discharge on 3rd, 7th and 30th POD. But in Group B, out of 50 patients one (1) patient had serous discharge in the wound on 3rd POD and none had serous discharge in the wound on 7th POD and 30th POD. So, this study correlates with Haman et al.[6] study.

A study of Sajjad et al.[7] showed that culture and sensitivity of pus from infected wound revealed that *Staphylococcus aureus* was the causative organism in 50% cases, while culture and sensitivity of serous discharge from infected wound of this study revealed no growth. So, we found no significant difference in outcome of inguinal herniotomy in children with and without peri-operative chemoprophylaxis. The use of peri-operative chemoprophylaxis did not show any added benefit

On the other hand this study also showed that Taka (500.00 ± 150.47) was spent for group A in comparison Taka (100.00 ± 30.23) was spent for Group B. Vaze et al.[10], Sajjad et al.[7], Hasan et al.[6] mentioned that there was no need of antibiotic prophylaxis in clean surgical cases like inguinal herniotomy. Vaze et al.[10] also showed that antibiotics were the responsible for great economic burden on the health system. Unnecessary use of antibiotic for prophylaxis was not cost effective for the patient. Herniotomy is clean surgery performed on a large scale in the children. Use of antibiotics is not free from antecedent ill-effects. It increases the risk of drug side effects, allergic reactions, drug interactions, and thrombophlebitis. This study had certain limitations, such as small sample size.

Peri-operative chemoprophylaxis does not significantly reduce the frequency of post-operative wound infection in inguinal herniotomy in children. Further well-designed research including multicentre adequate representative sample, focusing on children with inguinal herniotomy using the chemoprophylaxis and non- chemoprophylaxis will be needed.

Conclusion

The peri-operative chemoprophylaxis has no benefit on post-operative wound infection in clean surgery like inguinal herniotomy in children but can causes economic burden.

Conflict of Interest: None

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