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Linseed Oil in preventing Peri-ileostomy Skin Excoriation in Children

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Abstract

Background: Peri-ileostomy skin excoriation is an inevitable complication following Ileostomy specially in children. To prevent such excoriation Zinc oxide paste and several other conventional modalities has been used with some demerits. So in search of an alternative, Linseed oil has been proposed to prevent peri-ileostomy skin excoriation as it contains an omega-3 α Linolenic acid having anti-inflammatory, anti-allergic, skin soothing, healing and revitalizing properties. The aim of the study is to compare the effectiveness of Linseed oil and Zinc oxide paste in preventing peri-ileostomy skin excoriation. **Material & Methods:** This was a prospective comparative interventional study conducted in 76 children (ranging from 1 day to 18 years) admitted at Dhaka Shishu (Children) Hospital requiring Ileostomy care from March 2017 to September 2019. Out of 76 children, 38 were purposively selected and randomly allocated in each of Group A (Linseed oil Group) and Group B (Zinc oxide Group). Patients were followed up for 1 month after operation. During this period, 5 children were lost from follow-up in Group A and 4 in Group B. So we studied with 67 patients among which 33 enrolled in Group A and 34 in Group B. SPSS version 25 statistical software was used to analyze. **Results:** Age, sex, weight, primary diagnoses and types of operation showed no significant statistical differences between two groups. Area of excoriation was absent in 22 (66.7%) patients in Group A and 8 (23.5%) patients in Group B. No patient in Group A had > 3 cm excoriation while in Group B 8 (23.5%) patients had > 3 cm excoriation which was statistically significant ($p < 0.001$). 1st degree excoriation was significantly more in group B 24 (70.6%) than Group A 10 (30.3%) (p -value = 0.001). **Conclusions:** Linseed oil is more effective than Zinc oxide in preventing peri-ileostomy skin excoriation. It is locally available, easy to use and potential to minimize the peri-ileostomy skin excoriation.

Keywords:- Linseed oil, Zinc oxide paste, Peri-ileostomy skin excoriation.

INTRODUCTION

Intestinal stoma is a life-saving surgical procedure playing a vital role in the management of congenital and acquired gastrointestinal conditions.[1] It is a surgery in which part of the intestine is brought and protruded out through the abdominal wall and

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sutured to the skin to divert the stool or urine outside of the body, protect anastomotic site, decompress the bowel or combination of these indications.[2,3] There are three main types of intestinal stoma: Colostomy, Ileostomy & Ileal conduit.[4] Ileostomies are commonly performed in children as Double barreled ileostomy, Loop ileostomy, Bishop Koop ileostomy, Santulli ileostomy. Double barreled, Santulli and Loop ileostomies are high output ileostomies, whereas Bishop Koop ileostomy is a low output ileostomy. Complications following creation of ileostomy are prolapse, retraction, stenosis, parastomal hernia, skin excoriation.[5]

The outflow matter (effluent) of ileostomy comprises undigested food particles, gastric acids, digestive enzymes, alkalis, bilious matters, loads of bacteria and all refuses of the body through the gastrointestinal tract.[6] When ileostomy effluent leaks onto the skin, the enzymes break down the protective layers of the skin.[7] In addition, Stratum corneum layer of the skin, resistant to quite acidic fluid but more vulnerable to alkaline substances of the ileostomy effluent.[8] So, it can cause peri-ileostomy skin excoriation.

Peri-ileostomy skin excoriation can be defined as any wound that is adjacent to the ileostomy including erosion or ulceration of the peri-ileostomy skin leading to severe damage and wound dehiscence.[6] The effluent must be separated from the skin by applying skin barrier to minimize the peri-ileostomy skin excoriation.

Zinc oxide (ZnO) paste is commonly used in children for ileostomy care in our country, Aluminium paint is also used.[6] Moreover, the effluent must be contained within a pouching system or device adhering to the skin.[9] In Bangladesh, these are expensive facing difficulties to fit in neonates and small children due to lack of adequate space in their abdominal wall.[10,11] People of Bangladesh are not culturally and educationally comfortable with carrying excreta in a bag around. Moreover, removal and changing of the adhesive stoma devices can cause damage to the skin, leaking of effluent. Keeping all of these facts in mind, an alternative method was suitable for our children by using a very cheap and easily available herb, betel leaf (Piper betle) for stoma care.10 Nowadays, Complementary and Alternative Medicine (CAM) is welcomed by general population, Governments and World Health Organization as conservative treatment.[12] Linseed (Linum usitatissimum L.) oil is a herb extracted oil containing Oleic acid, Omega-3 α Linoleic acid, and Linolenic acid.[13] Linseed oil is easily available with an extensive qualities can be used for the benefit of human beings since ancient times. It has anti-inflammatory, anti-allergic, anti-ulcer properties with skin soothing, healing and revitalizing properties. Its topical use has been approved for a variety of skin disorders.[6,13,14,15] So, it can be used as an alternative treatment to prevent peri-ileostomy skin excoriation.

MATERIAL AND METHODS

This was a prospective comparative interventional study conducted in 76 children (ranging from 1 day to 18 years) admitted at Dhaka Shishu (Children) Hospital requiring ileostomy care from March 2017 to September 2019. It was conducted in the Division of Pediatric Surgery, Dhaka Shishu (Children) Hospital which is the allied Hospital of Bangladesh Institute of Child Health (BICH),

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Dhaka. Out of 76 children, 38 were purposively selected and randomly allocated in each of Group A (Linseed oil Group) and Group B (Zinc oxide Group). Patients were followed up for 1 month after operation. During this period, 5 children were lost from follow-up in Group A and 4 from Group B. So we studied with only 67 patients among which 33 enrolled in Group A and 34 in Group B. After admission each patient was thoroughly examined, investigated and all relevant information were noted. Among inclusion criteria patients with newly constructed temporary ileostomy, age ranged from 1 day to 18 years, patients of both sexes were included. Patients having pre-existing skin excoriation, prolapsed stoma, severe malnutrition and patients whose parents did not give written informed consent were excluded from the criteria. Data were collected and analyzed. The statistical analysis was conducted using SPSS (Statistical Package for Social Science) version 25 statistical software.

RESULTS

[Table 1] showed insignificant demographic differences e.g. age (obtained by Fisher's exact test), sex (obtained by Student's t test), weight (obtained by chi-square test) between Group A & Group B.

Table 1: Distribution of the study population by demographic characteristics (n=67)

Demographic characteristics	**Number of participants**		**p Value**
	Group A (n=33)	**Group B (n=34)**	
	No. (%)		
Within 1 month	28 (84.8%)	25 (73.5%)	0.213
More than 1 month to 1 year	3 (9.1%)	2 (5.9%)	
More than 1 year	2 (6.1%)	7 (20.6%)	
Sex			
Male	20(60.6%)	18(52.9%)	> 0.05
Female	13(39.4%)	16(47.1%)	
Weight (Kg)			
Mean ±SD	3.95 ±2.79	4.41 ±3.07	0.524

Table 2: Distribution of the study population by Primary diagnosis and Type of operation (n=67)

Type of diagnosis and operation	**Number of participants**		**p value**
	Group A (n=33)	**Group B (n=34)**	0.649
	No. (%)		
Primary diagnosis			
Meconium ileus	16 (48.5)	17 (50)	
Ileal atresia	9 (27.3)	10 (29.4)	
Hirschsprung disease	5 (15.2)	2 (5.9)	
Intussusception	3 (9.1)	5 (14.7)	
Type of operation			1.000
Double barreled ileostomy	21(63.6)	21 (61.8)	
Bishop Koop ileostomy	9 (27.3)	10 (29.4)	

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Loop ileostomy	3 (9.1)	3 (8.8)	

Table 3: Distribution of the study population by excoriation characteristics (n=67)

Comparison	**Group A**	**Group B**	**p value**
	No. (%)	**No. (%)**	
Area (in cm) of excoriation			
Absent	22 (66.7)	8 (23.5)	< 0.001
Up to 1.5	9 (27.3)	9 (26.5)	
2-2.5	2 (6.1)	9 (26.5)	
> 3	0 (0.0)	8 (23.5)	
Degree of excoriation			
0 degree	23 (69.7)	10 (29.4)	0.001
1st degree	10 (30.3)	24 (70.6)	
2nd degree	0 (0.0)	0 (0.0)	

Table 4: Distribution of the study population by outcome (n=67)

Outcome	**Group A**	**Group B**
	No. (%)	**No. (%)**
Wound infection		
Absent	33 (100.0)	34 (100.0)
Present	0 (0.0)	0 (0.0)
Total	33 (100.0)	34 (100.0)
Wound dehiscence		
Absent	33 (100.0)	34 (100.0)
Present	0 (0.0)	0 (0.0)
Total	33 (100.0)	34 (100.0)

[Table 2] showed insignificant statistical differences in both primary diagnosis (obtained by Fisher's exact test) & type of operation (obtained by Fisher's exact test) in between Group A & Group B.

[Table 3] showed significant statistical differences in area of excoriation (obtained by Fisher's exact test) and in degree of excoriation (obtained by chi-square test) in between Group A & Group B.

[Table 4] showed no patient in any Group developed wound infection and wound dehiscence within the study period.

DISCUSSION

In this study, in Group A 84.8% patients and in Group B 73.5% patients had age within one month, as majority of the patients had meconium ileus and ileal atresia. No significant age difference was seen between the Groups which supported the randomization of the present study.

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Considering sex, in this study, male/female ratio in both groups were 1.3:1 with no statistical significance. A study carried out by Banu et al., about 'Betel leaf in stoma care' showed that male/female ratio was 1.7:1.10 Though meconium ileus and jejuno-ileal atresia occurs equally both in males and females, slight male predominance was reported in intestinal obstruction.[16,17] Similarly, as the patients of current study having significant number of intestinal obstruction, the male predominance prevailed. Though the mean weight of patients were 3.95(±2.79) kg in Group A and Group B patients were 4.41(±3.07) kg in current study without statistical significance.

Focusing on primary diagnosis, in Group A 48.5% patients had meconium ileus, 27.3% patients had ileal atresia while in Group B, 50% patients had meconium ileus, 29.4% had ileal atresia. No significant statistical difference in primary diagnosis were observed between two Groups.

The present study found that double barreled ileostomy was the most common type of ileostomy, i.e. 63.6% patients in Group A and 61.8% patients in Group B, constructed for all primary diseases. This procedure was required less operative and anesthesia times because complete evacuation of inspissated meconium was unnecessary and no intra-abdominal anastomosis was required, thus avoiding the risk of anastomotic leakage.[18]

Peristomal skin complications (PSCs) are a constant challenge and the most common postoperative complication for a great majority of individuals with a stoma. Various studies have reported a PSC rate ranging from 18–73%.[19,20,21,22,23,24] In Ileostomies there is frequent fluid effluent containing a high concentration of active digestive enzymes, particularly in the more proximal stomas which causes irritant reaction in the skin.19 The present study revealed that area of excoriation was significantly absent in Group A, 66.7% than Group B, 23.5%. No patients in Group A had > 3 cm excoriation while in Group B, 23.5% patients had > 3 cm excoriation. This result supports the study result of Saxena et al,[15] conducted among adult patients requiring Ileostomy, where area of excoriation was significantly absent among patients treated with Linseed oil than patients treated with simple dressing. The present study was found that zero degree excoriation was significantly more in Group A, 69.7% than Group B, 29.4% (p = 0.001). Similarly, in study of Saxena et al,[15] zero degree excoriation was significantly more in patients treated with Linseed oil than patients treated with simple dressing group.6 Banu et al., carried out study among the 495 patients under betel leaf in stoma care, only 2.6% developed skin excoriation; among the 128 patients using ostomy bags, 40.65% had skin excoriation.[10] Huq et al,[11] revealed, among the 65 patients who used ostomy bags 21.53% developed peristomal skin excoriation. On the contrary, out of 86 patients who were managed with betel leaf 20.93% developed peristomal skin excoriation. Both of these above-mentioned studies were conducted in patients with stoma (i.e. colostomy and ileostomy both).[11] Area and degree of excoriation were not categorized in both studies.

In current study, all patients were carefully observed for developing wound infection and wound dehiscence. No patient developed wound infection and wound dehiscence within

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this follow-up period. So, it was obvious from the above discussion that Linseed oil is more effective in the management of peristomal skin complications compared to Zinc oxide.

Linseed oil (flaxseed oil) is obtained from the dried ripe seeds of the flax plant Linum ustitatissmum, is a rich source of Alpha Linoleic Acid (ALA), an omega-3 polyunsaturated fatty acid. ALA metabolites have anti-inflammatory properties and help prevent skin inflammation and excoriation.[14] In addition, the oily base of the Linseed oil (pH > 7) forms a hydrophobic layer which prevents the enzymes in the ileostomy effluents from coming in contact with the skin and prevents the peri-ileostomy skin layer from maceration.

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Both high and low output ileostomies were included. Study patients were of different age groups having different skin thicknesses.

CONCLUSION

Linseed oil is more effective than Zinc oxide in preventing peri-ileostomy skin excoriation in children. It is locally available, easy to use and potential to minimize the complications associated with peri-ileostomy skin excoriation.

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