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Different Approaches for Colostomy Skin Closure to Provide an Acceptable Appearance

Kolostomi Kapatılmasında Daha Kabul Edilebilir Bir Cilt Görünümü İçin Farklı Yaklaşımlar

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ABSTRACT

Objective: Colostomy can be performed in various cases in which the gastrointestinal tract cannot be kept intact in children. Conventional colostomy closure approaches can cause serious aesthetic concerns. In order to avoid wound closure problems and to obtain cosmetically better results, new methods such as elliptical excision, S-shape flap, M-shape flap or Z-plasty can be used. In this study, we would like to assess the colostomy closure techniques which can provide more acceptable cosmetic results.
Material and Method: 24 colostomy patients who were operated between May 2017 and December 2017 include to study. Patients were evaluated prospectively and randomized. During study period, 12 patients were treated with CM (Group 1) whereas other 12 patients were treated with NM (Group 2). Results in skin healing and skin scar were assessed and photographed in certain periods. 3 surgeons, who were blind in closure technique, were asked to assess the photographic results in terms of healing and final scar. The data obtained was statistically reviewed.
Results: 24 (14 male – 10 female) patients with a mean age of 19 (Range: 6 – 36) months were included in the study. Following surgery, skin closure and appearance in Group 2 was significantly better than Group 1 ($p<1$).
Conclusion: By using NM, "dog-ears" deformity which forms during primary closure of colostomy using CM can be avoided. In addition, using New Methods can be beneficial in eliminating the severe cosmetic and aesthetic concerns in both patients and parents for the surgery.
Keywords: *Colostomy, elliptical excision, s-shape flap, M-shape flap, z-shape flap, skin scar*

ÖZET

Giriş: Çocuklarda gastrointestinal sistemin sağlam tutulamadığı çeşitli durumlarda kolostomi yapılabilir. Geleneksel kolostomi kapatma yaklaşımları ciddi estetik kaygılara neden olabilir. Yara kapanma problemlerini önlemek ve kozmetik olarak daha iyi sonuçlar elde etmek için eliptik eksizyon, S-şekilli flep, M-şekilli flep veya Z-plasti gibi yeni yöntemler kullanılabilir. Bu çalışmada daha kabul edilebilir kozmetik sonuçlar sağlayabilecek kolostomi kapatma tekniklerini değerlendirmek istedik.
Materyal ve Metod: Mayıs 2017 ile Aralık 2017 tarihleri arasında opere edilen 24 kolostomi hastası çalışmaya dahil edildi. Hastalar prospektif olarak değerlendirildi ve randomize edildi. Çalışma süresince 12 hastaya konvansiyonel metod (CM) (Grup 1), diğer 12 hastaya new metod (NM) (Grup 2) uygulandı. Cilt iyileşmesi ve cilt izindeki sonuçlar belirli periyotlarda değerlendirildi ve fotoğraflandı. Kapatma tekniğinde kör olan 3 cerrahtan fotografik sonuçları iyileşme ve son skar açısından değerlendirmeleri istendi. Elde edilen veriler istatistiksel olarak incelendi.
Bulgular: Ortalama yaşı 19 (Aralık: 6 – 36) ay olan 24 (14 erkek – 10 kadın) hasta çalışmaya dahil edildi. Ameliyat sonrası cilt kapanması ve görünümü Grup 2'de Grup 1'e göre anlamlı olarak daha iyiydi ($p<1$).
Sonuç: NM kullanılarak kolostominin primer kapatılması sırasında oluşan "köpek kulak" deformitesinin CM kullanılarak önüne geçilebilir. Ayrıca Yeni Yöntemlerin kullanılması hem hasta hem de ebeveynlerde ameliyat için ciddi kozmetik ve estetik kaygıların giderilmesinde faydalı olabilir.
Anahtar kelimeler: *Kolostomi, eliptik eksizyon, s-şekilli flep, M-şekilli flep, z-şekilli flep, cilt skarı*

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INTRODUCTION

Colostomy is defined as creating a temporary or permanent stoma on abdominal wall in conditions where gastrointestinal system intestinal continuity cannot be obtained (Soomro et al., 2010; Demirogullari et al., 2011). Colostomies are life-saving procedures in clinical application of pediatric surgeries in the treatment of both congenital and acquired conditions or as a primary surgical approach in different levels of surgical operations (Demirogullari et al., 2011). Elongated colostomy intervals and colostomy areas related with the growth in children cause a widening of colostomy area and hence; a wide skin defect (Figure 1).

Figure 1. Colostomy defect before reconstruction

This defect is usually primarily closed by conventional method (CM) where skin on the wound sides is connected end-to-end. The long and significant scar as a result of this method can cause severe cosmetic concerns in patients (Figure 2).

Figure 2. Classic incision scar

Figure 3. Eliptic incision of colostomy area (before).

Figure 4. Closure of eliptic incision with s-plasty (after).

To improve the appearance of colostomy scar, various excision methods and flap types were defined in the literature. New methods (NM) for colostomy skin closure such as elliptical excision (Figure 3-4), s-shape flap application, m-shape flap application (Figure 5-6) and z-plasty application are frequently used to avoid formation of "dog ears" appearance in the wound site and improve cosmetic outcome of surgery.

In this study, we assessed the incisions and flap methods in colostomy closure surgeries used for obtaining a more aesthetically pleasing skin scar results defined in the literature.

Figure 5. M-plasty for skin closure(postoperative)

Figure 6. M-plasty incision scar (After 2 month)

MATERIAL and METHOD

The universe of this retrospective study consisted of subjects who underwent colostomy closure surgery in the pediatric surgery department. Twenty-four pediatric patients who were operated for colostomy closure between May 2017 and December 2017 were evaluated. Patients were divided into 2 groups. First 12 pediatric patients who came to the clinic were treated with CM colostomy closure group (Group 1) whereas other 12 pediatric patients were treated using NM colostomy closure group (Group 2).

After the facial defect was repaired in the CM group, the skin was closed with 4/0 proline with simple sutures. And dog ear was corrected.

In the NM group, the circumference of the colostomy was elliptically incised by ¾ and/or s-shape flap and/or m-shape flap and/or z-plasty and skin closed intradermally with 5/0 vicryl.

Skin healing and final scar results were evaluated and photographed at 2-week intervals. Three surgeons who were blinded in colostomy technique were asked to evaluate the results from photos in terms of healing scar using a 5-point scale (1- worst, 5-best). Data obtained from the surgeons was statistically analyzed. Normality controls were done using Shapiro-Wilk Test. Groups were compared using independent samples t-test and statistical significance level was set as $p<0.05$. Power analysis was used to find the sample size using the G*power 3.1 software (G*Power 2, Dusseldorf, Germany). With a population representation of 0.95, a confidence level of 0.95, and a margin of error of 0.05, the sample size was determined to be at least 10 subjects for each group. After calculation, 12 children were included in each group.

RESULTS

The 24 (14 male - 10 female) pediatric patients with a mean age of 19 (range: 6-36) months who underwent surgery for colostomy closure were included in our study. Image 1-3 are intraoperative views before closure. Image 2 image after closing with the CM closure. Image 4, 5, 6 show the images after NM closure. Post-operative photos in Group 1 and Group 2 were compared. According to the surgeons' review on healing site photos; Group 2 has a significantly better skin appearance in comparison with Group 1 (Figure 1, Table 1).

Table 1. The evaluation of surgeons regarding to methods

Evaluation	CM				NM				p
	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	
	1.50	0.67	1	3	3.75	0.75	3	5	<0.001

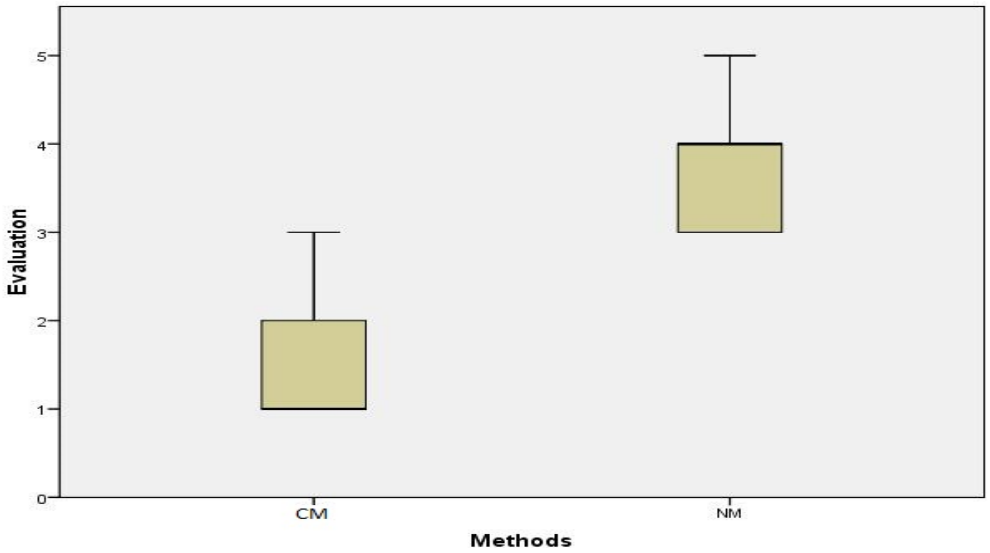

Figure 1. Evaluation of the methods

Elliptical incision had an advantage over scar length whereas double M-plasty application, S-plasty application or Z-plasty application have more cosmetically appearing results in colostomy closure scar tissue.

DISCUSSION

Primary closure of wide circular skin defect during colostomy closure causes severe depressed scar tissue and dog ears deformation. Dog ear deformation is the excessive skin on skin tips when wound sides were asymmetrically closed (Kishi et al., 2008). This causes aesthetic anxiety in patients and their parents. Even though the surgeon was able to save the patient's life with single or multiple surgical interventions, one must not overlook the cosmetic concerns of the patients and their guardians.

Elliptical elongation, m-plasty, s-shape flap or z-plasty are some of the techniques in revision of dog ear deformities (Kishi et al., 2008). Dog ear deformity is rare when defect's width/length ratio is ¾ (Wisco et al.,2009; Liu et al.,2015). However, if there is a risk of secondary infection or circulatory problem in surgery field the flap operation, which is planned for correction of dog ear deformity, should be postponed to the second surgery (Kishi et al., 2008). Elliptical or fusiform excisions are the most frequently used procedures in cutaneous surgery and were told to have good cosmetic results in various studies found in the literature. Excision on proper skin tension lines with appropriate length/width ratio, preventing inversion of skin ends and good suturing techniques are essential for a satisfactory cosmetic appearance (Zitelli et al., 1990).

Cutaneous surgery usually employs circular excision followed by correction of dog ear deformity. A number of techniques were developed in correction of dog ear deformities according to skin properties, defect size and anatomical location (Sebastian et al., 2009). In order to understand the advantage of one certain technique, one must keep that both horizontal and vertical incision scars would have contraction (Zitelli et al., 1990). If the suture technique used does not evert wound lips, this might cause a depression in scar due to vertical contraction. Horizontal contraction results are usually associated with surface contour (Zitelli et al., 1990). In order to minimize those effects, total scar length of the excision should be elongated more than the length between two sides of the scar (Liu et al.,2015; Wisco et al.,2009; Zitelli et al., 1990). To decrease scar tissue depression, scar line elongation techniques such as Z-plasty techniques or geometric closure that breaks straight scar lines are used (Zitelli et al., 1990). In the present study, the cosmetic results of the Z-plasty technique were better than CM.

If a need for skin elongation from colostomy stoma to abdominal midline following a colostomy scar excision ensues, elliptical excision correction technique might provide a better outcome without additional elongation.

S-plasty is one of the most commonly used technique in repairing convex surface defects (Sebastian et al. 2009; Liu et al.,2015). S-plasty is a variant of fusiform excision which effectively increases total scar length while keeping the linear length between two ends; decreasing scar tension forces (Sebastian et al., 2009; Liu et al.,2015). A simple s-plasty can be used to minimize scar depression on a convex surface for obtaining a smoother and better cosmetic appearance (Sebastian et al., 2009; Zitelli et al., 1990). The results of the present study are also similar.

M-plasty and Double M-plasty are the modified versions of conventional elliptical excision. A short excision based on elliptical incision improves the cosmetic appearance (Wisco et al.,2009; Agorio et al.,2015). Double-M plasty is usually used to obtain a short scar length between start and end points of wound despite an increase in total scar length and decreased tension on scar line. Double-M plasty is a good aesthetic method in the closure of circular wounds. In the present study, skin scars closed with M-plasty and Double M-plasty methods gave better cosmetic results.

Conclusion

Primary closure of skin using CM in colostomy can cause severe cosmetic worries due to dog ear deformity. Scar elongation using elliptical excision,

double-M plasty, s-plasty and z-plasty are efficient and reliable techniques in achieving more cosmetically acceptable results in colostomy closure scar.

Conflict of interest

There are no conflict of interest.

Ethics Approval

The present study with the recordings of the participants has been approved by Local Ethical Committee belonging to Van YYU (approval number: 2018/28).

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