Necessity of preventive colostomy for Fournier's gangrene of the anorectal region

Anorektal bölgeyi içine alan Fournier gangreninde koruyucu kolostomi gereksinimi

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BACKGROUND

The aim of this study was to evaluate the necessity of preventive colostomy for Fournier's gangrene of the anorectal region.

METHODS

The medical records of 37 patients with perianal Fournier's gangrene were evaluated retrospectively. Debridement(s) alone was performed in 18 patients (Group D), while debridement(s) plus Hartmann colostomy was performed in 19 patients (Group D&HC).

RESULTS

There were no statistically significant differences between the D and D&HC groups with respect to mean age (p=0.73), sex ratio (p=1.00), diabetes mellitus (p=0.88), concomitant diseases (p=0.57), and number of debridements (p=0.75). The medical and surgical complication and mortality rates and duration of hospital and intensive care unit stays were also not significantly different between the D and D&HC groups (p>0.05). Fecal diversion was done at the initial operation in 11 patients, at second operation in 6 patients, and at third operation in 2 patients. When compared, morbidity rates were similar, but mortality rates were statistically different (p=0.031).

CONCLUSION

Fournier's gangrene remains a difficult surgical problem. Despite aggressive multidisciplinary treatment, it still has a high mortality rate. Fecal diversion in the treatment of Fournier's gangrene is controversial. If necessary, preventive colostomy should be performed during the initial debridement.

Key Words: Anorectal region; Fournier's gangrene; preventive colostomy.

AMAÇ

Bu çalışmanın amacı, anorektal bölgeyi içine alan Fournier gangreni olgularında koruyucu kolostominin gerekliliğini değerlendirmektir.

GEREÇ VE YÖNTEM

Perianal bölgeyi içine alan 37 Fournier gangreni olgusunun tıbbi kayıtları geriye dönük olarak değerlendirildi. On sekiz hastaya sadece debridman uygulanırken (Grup D), 19 hastaya debridmanın yanısıra Hartmann kolostomisi de uygulandı (Grup D ve HC).

BULGULAR

Gruplara arasında yaş (p=0,73), cinsiyet (p=1,00), diabetes mellitus varlığı (p=0,88), eşlik eden hastalıklar (p=0,57) ve uygulanan debridman sayısı (p=0,75) yönünden istatistik olarak anlamlı fark saptanmadı. Medikal ve cerrahi komplikasyonlar, mortalite oranları, hastanede ve yoğun bakım ünitesinde kalma süreleri arasında anlamlı fark saptanmadı (p>0,05). Fekal diversiyon 11 hastada ilk operasyonda yapılırken, 6 hastada ikinci, 2 hastada ise üçüncü debridman sırasında uygulandı. Bu hastalarda morbidite aynı iken, mortalite arasında istatistiksel olarak anlamlı fark saptandı (p=0,031).

SONUÇ

Fournier gangreni, hala zor bir klinik problemdir. Etkin multidisipliner yaklaşımlara karşın mortalite oranı yüksektir. Fekal diversiyon Fournier gangreni tedavisinde hala tartışmalıdır. Eğer gerekli ise koruyucu kolostomi ilk debridman sırasında uygulanmalıdır.

Anahtar Sözcükler: Anorektal bölge; Fournier gangreni; koruyucu kolostomi.

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Necrotizing fasciitis of the scrotal, perineal and penile subcutaneous soft tissues and fascias, also known as Fournier's gangrene (FG), is an uncommon condition that can affect patients of any age and rapidly progress to life-threatening disease.[1,2]

FG has a high death rate, ranging from 15-50%, and is an acute surgical emergency.[3,4] Treatment of FG includes rapid fluid resuscitation, wide excisions of devitalized tissues and parenteral administration of broad-spectrum antibiotics.[5]

Attempts have been made to use specific features to identify patients with FG and to predict mortality, but there is no consensus regarding which factor is most important. Numerous studies have shown that FG is associated with considerable morbidity, and patients require surgical treatment involving multiple and aggressive debridements.[5,6] In contrast, repeated surgical debridement, even if performed within the first 24 hours of presentation, had no impact on the outcome in FG patients.[7,8]

Preventive colostomy is another application in FG. Colostomy may not be necessary in penile and scrotal FG because of relatively low fecal contamination, but in perianal FG it may be useful to accelerate wound healing by avoiding fecal contamination. Colostomy should be performed in incontinent cases, but the colostomy need in continent perianal FG has not been investigated or reported sufficiently. We investigated the relationship of preventive colostomy with morbidity, length of hospital stay (LOS) and survival.

MATERIALS AND METHODS

Patients

From January 1995 to January 2007, 51 patients underwent surgery for FG at the Department of General Surgery, Erciyes University School of Medicine. Patients who were incontinent (n=4), had incomplete records (n=3), or who had simple scrotal and penile FG (n=7) were excluded from the study. The remaining 37 continent patients with only perianal or perianal and scrotal FG who underwent urgent debridement comprised the study group and were evaluated retrospectively. Debridement(s) alone was performed in 18 patients (Group D), and debridement plus Hartmann colostomy was performed in 19 patients (Group D&HC).

Biochemical, hematological and bacteriologic study results on admission, time from onset of symptoms to presentation, timing and number of surgical debridement(s), antibiotic therapy used, and outcomes including morbidity, LOS and mortality were all recorded.

Diagnosis

The diagnosis of FG was made based on clinical features such as erythema, swelling, crepitation and necrosis. Tissue cultures were obtained for the identification of the microorganisms and the provision of sensitive antibiotic treatment.

Treatment

Before surgery, all patients received fluids to correct electrolyte imbalances and acid-base disturbances, and were treated with immediate surgical debridement. Necrotic tissues were excised until healthy tissue was reached.

A diverting colostomy was performed in patients if perineal wounds could not be appropriately managed as a consequence of constant fecal contamination. Other indications for diverting colostomy were suspicion of rectal perforation or fistulas.

In all cases, preoperative broad-spectrum antibiotics were started at the time of induction of anesthesia and later changed or continued according to the microbial culture results.

Statistical analysis

Differences among the groups were compared using chi-square test and Mann-Whitney U test. The data were analyzed with the SPSS software package (version 13.0). Significance was set at $p<0.05$.

RESULTS

The mean age (p=0.73) and sex ratio (p=1.00) of the patients were not statistically different between the D and D&HC groups. Diabetes mellitus (DM) and concomitant diseases were more frequent in the D&HC group (n=11, 58% and n=8, 42%, respectively), but this difference was not statistically significant (p=0.88 and p=0.57) when compared to the D group (n=9, 50% and n=5, 27%). There was no significant difference among groups with regard to the number of debridement(s) (p=0.75). Patient demographics are shown in Table 1.

Pulmonary complications were the most frequent morbidities, arising in 5 D patients and 6 D&HC patients. Postoperative outcomes of the two study groups are shown in Table 2. The medical and surgical complication rates were not significantly differ-

Table 1. Patient demographics

	Group D (n=18)	Group D&HC (n=19)	p
Age (years)	52.7±13.1 (32-74)	54.6±11.1 (35-70)	0.73#
Sex ratio (male/female)	11/7	11/8	1.00*
Diabetes mellitus (DM)	9 (50)	11 (58)	0.88*
Concomitant disease (except DM)	5 (27)	8 (42)	0.57*
Number of debridement	3.05±0.87 (1-7)	3.00±1.00 (1-8)	0.75#

D: Debridement; D&HC: Debridement plus Hartmann colostomy.
Values are mean ± standard deviation; numbers in parentheses are ranges or percentages.
Mann-Whitney U test; *χ^2 test.

Table 2. Postoperative outcomes

	Group D (n=18)	Group D&HC (n=19)	p
Medical complications			1.00
Cardiac	2	2	
Respiratory	5	6	
Others	3	2	
Surgical complications			0.11
Wound infections	–	1	
Stoma complications	–	1	
Prolonged ileus (7 days)	–	1	
Eventration/evisceration	–	1	
Mortality	7 (39)	8 (42)	1.00

D: Debridement; D&HC: Debridement plus Hartmann colostomy.
*Cardiac complications included dysrhythmia, heart failure, and myocardial infarction; respiratory complications included atelectasis, pneumonia, adult respiratory distress syndrome, and pulmonary embolus; other complications included urinary tract infection, stroke, and acute thromboembolic disease of the lower extremities.
Values in parentheses are percentages.

ent between the D and D&HC groups (p=1.00). In the D&HC group, a second operation was performed for stoma-related complication in 1 patient (5.2%) who underwent the Hartmann procedure (n=19), and for evisceration in 1 patient (5.2%). There were no significant differences among groups with regard to the rate of second operations (p=0.48).

Mortality rates in the D and D&HC groups were 39% (7 patients) and 42% (8 patients), respectively (Table 2). Mortalities were not related to the surgical approach in either group and instead were mainly due to sepsis and cardiopulmonary failure. In the D group, mortality was due to sepsis (4 patients), pulmonary complications (2 patients), and myocardial infarction (1 patient). In the D&HC group, mortality was due to sepsis (3 patients), pulmonary complications (4 patients) and intra-abdominal abscess-related peritonitis (1 patient). There were no significant differences in the mortality rates between the study groups (p=1.00).

Postoperative outcomes according to the fecal diversion timing in the D&HC group are shown in Table 3. Fecal diversion was done at the initial operation in 11 patients, at second operation in 6 patients, and at third operation in 2 patients. When compared, medical and surgical complication rates were similar (p>0.05), but mortality rates were statistically different (p=0.031).

Median duration of hospital and intensive care unit (ICU) stays were 18 (range: 2-37) and 2 (range: 0-12) days in the D group and 17 (range: 1-41) and 1 (range: 0-13) day(s) in the D&HC group, respectively (Table 4). The duration of hospital and postoperative ICU stays were not significantly different between the study groups (p>0.05).

DISCUSSION

Fournier's gangrene is a necrotizing fasciitis of the perineal, genital and perianal regions, and is characterized by gangrene of subcutaneous tissue and the overlying skin.[9] Successful treatment of FG

Table 3. Postoperative outcomes in the D&HC group according to the fecal diversion timing

	HC at 1st debridement (n=11)	HC at 2nd debridement (n=6)	HC at 3rd debridement (n=2)	p
Medical complications	5 (45)	3 (50)	2 (100)	0.35
Surgical complications	2 (18)	1 (16)	1 (50)	0.56
Mortality	2 (18)	4 (66)	2 (100)	0.031

HC: Hartmann colostomy; D&HC: Debridement plus Hartmann colostomy.
*Medical complications included cardiac and respiratory complications and other complications including urinary tract infection, stroke, and acute thromboembolic disease of the lower extremities. Surgical complications included wound infections, stoma-related complications, prolonged ileus (7 days), and eventration/ evisceration.
Values in parentheses are percentages.

is related to early diagnosis and appropriate intervention. The main points of management are aggressive hemodynamic stabilization, antibiotic therapy covering all suspected involved bacteria and urgent surgical debridement.[5,6,10,11] All necrotic skin and subcutaneous tissues should be excised aggressively. In the case of uncontrolled infections and necrosis, repeated surgical debridements should be done. In our cases, 1-8 debridement(s) (mean: 3) were performed in operation rooms. Chawla et al.[7] reported that survivors had an average of 2.3 surgical debridements while nonsurvivors had 5.2 on average. We found that the number of debridements was not significantly different between Group D and Group D&HC or between survivors and nonsurvivors. However, it was shown that repeated debridements did not appear to influence surgical outcome, as in our study.[8,12] To accelerate the healing of FG, topical unprocessed honey has been used recently as an adjuvant dressing agent.[13] Hyperbaric oxygen therapy and enzymatic debridements with lyophilized collagenase application are other treatment alternatives that have been shown to be beneficial.[14,15]

Diabetes has been often associated with an increased incidence of FG. It has been reported that DM is found in 50-73%,[16,17] and Olsofko et al.[18] found high serum glucose levels in 85% of FG patients. Korkut et al.[19] reported no mortalities in non-diabetic cases and 36% in their diabetic cases. Hyperglycemia has been found to affect adherence, chemotaxis, and bactericidal activities of phago-

cytes. It has also been shown to have detrimental effects on cellular immunity.[10] The rate of diabetic patients in our series was 46%. No significant increase in the mortality rate was found among the diabetics when compared to nondiabetic patients in our study, confirming a similar observation in some studies.[12,20]

Fournier's gangrene is a suppurative, polymicrobial bacterial infection. Both aerobic and anaerobic bacteria are always present but anaerobes are less frequently identified.[21] The most commonly isolated aerobic microorganisms are *Escherichia coli*, *Klebsiella pneumoniae* and *Staphylococcus aureus*; the most commonly isolated anaerobic microorganism is *Bacteroides fragilis*.[22,23] Colostomy is needed to prevent fecal contamination, and in the presence of sphincteric dysfunction, rectal perforation or fistula. Although some controversy exists about the need for fecal diversion, some surgeons prefer fecal diversion in perianal FG because of decreased contamination and faster wound healing.[24,25] There is restricted data about colostomy need and timing in the literature. Chen et al.[26] reported that in patients with FG due to anorectal disease, those who received a primary diverting colostomy had a lower mortality rate as compared with those who received secondary colostomy. In our study, temporary fecal diversion was done at the initial operation in 11 patients, at second operation in 6 patients, and at third operation in 2 patients. When compared, morbidity rates were similar, but mortality rates were statistically differ-

Table 4. Duration of postoperative ICU and hospital stay in patients

	Group D (n=18)	Group D&HC (n=19)	p
Postoperative ICU stay (days)	2 (0-12)	1 (0-13)	0.64
Hospital stay (days)	18 (2-37)	17 (1-41)	0.46

D: Debridement; D&HC: Debridement plus Hartmann colostomy; ICU: Intensive care unit.
Values are median; ranges shown in parentheses.

ent (p=0.031). These results suggest that diverting colostomy during the early stage in severe cases is necessary and effective. The number of surgical debridements was not significantly different between groups. This result suggests that preventive colostomy does not reduce debridement number; however, diverting colostomy may lead to early oral intake and thus may help to improve the wound healing process with better nutrition and less contamination of wounds. Total parenteral nutrition can also be achieved without colostomy, but this may reduce immunological competence. On the other hand, serious stoma-related complications, like wound infection, stomal ischemia, prolonged ileus, and evisceration were observed in one patient each. We performed a second surgery for stoma-related complications and evisceration. Surprisingly, the colostomy procedure did not prolong the hospital and ICU stay, but for an effective evaluation, complications, mortality and LOS for both stages of the Hartmann procedure (Hartmann colostomy and colostomy closure) should be taken into consideration. Most of these patients had comorbid diseases; thus, the mortality and morbidity rates and LOS were higher than expected because of concomitant diseases.

In conclusion, FG remains a difficult surgical problem. Despite aggressive multidisciplinary treatment, it still has a high mortality rate. Fecal diversion in the treatment of FG is controversial. Based on this small group and the difficulty in comparing patients with many variables, we conclude that fecal diversion did not make a difference in overall patient survival. Therefore, we suggest that, if necessary, it should be performed during the initial debridement.

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