

Laparostomic Treatment of Diffuse Peritonitis in Northern Uganda.

G. Mari, J. Abonga, J. Olin, M. Komakech, L. Ojom, M. Origi, A. Costanzi, P. Brown
Saint Joseph Hospital, Kitgum, Uganda

Correspondence to: Giulio Mari, Department of General Surgery Desio Hospital (Italy),
Email: giul_mari@yahoo.it,

Keywords: Bacterial infection, Diagnosis; Surgery, laparostomy, laparostomic treatment, peritonitis, uterine perforation, second look.

We report a series of 10 cases of patients who were admitted in our hospital for abdominal pain and respiratory distress. All patients underwent explorative laparotomy. Intra-operative findings were incarcerated abdomen with fibrin covered ileus and free pus. Surgical treatment was therefore Laparostomic approach with peritoneal lavage for all of them. Patients were re-operated every 48 h for peritoneal lavage. Number of re-laparotomy was $4,5 \pm 1,7$. No patients required intestinal resection. Abdominal wall definitive closure was done when peritonitis was solved and bowel function was restored. 3 patients died. The 7 survived patients were discharged at $19 \pm 5,8$ days with a clean wound and no signs of ongoing sepsis. Laparostomic treatment of generalized peritonitis is actually possible and effective also in potentially infected environment as a Northern Uganda Surgical Ward. Avoidance of iatrogenic bowel injury is a main factor in patient's outcome.

Introduction

Emergency laparotomy for acute peritonitis is a common procedure performed in Northern Uganda. Many different diseases can generate the development of peritonitis¹. Peritonitis can nevertheless present with a slow and unclear onset². In this case the main symptom that brings patients to hospital is intestinal obstruction. The small bowel can in fact be incarcerated in fibrin formed adhesions. Peristalsis as a consequence of prolonged inflammation stops. At surgery often times signs of the initial cause of sepsis can be undetectable. Surgical treatment should be therefore aimed to restore bowel function extinguishing sepsis remnants³. Freeing adhesions due to the high risk of bowel perforation is discouraged at the beginning. Lavage with warm saline, removal of intra-abdominal abscesses and free pus if present, has to be done as many times as required⁴.

Closure of the initial laparotomy is therefore not possible in all cases, especially when patients already developed a compartment syndrome⁵. Re-look laparotomies could then be required⁶. Several techniques for temporary abdominal closure have been developed. The techniques described were VAC, mesh/sheet, packing, Wittmann patch, Bogotá bag dynamic retention sutures, zipper, skin only and locking device⁷. Not all of them are possible far from the western world.

In Northern Uganda economic means are very poor as clinical and surgical available devices⁸. Chances to therefore perform such techniques depend on the surgeon's skills and on the availability of the devices. Disease pattern requiring open abdomen is accompanied by high morbidity and mortality⁹ above all where Intensive Care Unit is not present as in Saint Joseph Hospital, Kitgum, Uganda. The major challenge in the management of patients with an infected open abdomen is to control septic peritonitis and to facilitate repeated abdominal exploration delaying primary closure^{7,10}. We report 10 cases treated with laparostomy for diffuse peritonitis with undetected origin.

Patients and Methods

Between February 2011 and February 2012 in Saint Joseph Hospital, Kitgum Ds, Uganda, 10 patients were admitted from Outpatient department (OPD) for acute abdominal pain lasting for more than 7 days associated to absence of bowel movements. Respiratory rate was increased in all of them. (patient's characteristic are reported in table 1).

Table 1. Patients’ description

	M	F
N ^o	3	7
Age	31(25-43)	20 (18-23)
Past pregnancies	N/A	1.6
Ongoing pregnancies	N/A	-
Mean WCC at admission	14,500	15,200
Mean Hb level at admission	10.8	9.5
Mean T. at admission	38.3 ^o	38.7 ^o
Bowel function absence	3/3	7/7
RR < 20	3/3	7/7
Sat. O2 < 95%	2/3	6/7

WCC= White cell count

Hb =Haemoglobin

RR =Respiratory rate

Sat. O2 = Oxygen saturation

N/A = Not applicable

Abdominal plain X ray was performed showing distended paralytic ileus with no free air. Indication for explorative laparotomy was given for all of them. After a small exploratory incision all patients received a xifo-pubic incision. Intra-operative findings were incarcerated abdomen with fibrin covered ileus, free pus and pelvic abscesses (intra-abdominal findings are described in table 2).

Table 2. Intra-operative findings

	M	F
Incarcerated abdomen	3/3	7/7
Pelvic abscess	3/3	6/7
Bowel perforation	0/3	0/7
Uterine perforation	0/3	0/7
Free pus	3/3	7/7

No intestinal free content was found. No pus or abscesses were found above the transverse mesocolon. Peritoneal lavage was done with warm crystalloid (at least 4 L) solution and iodopovidone 2 % solution. First step was evacuating free pus and pelvic abscesses. Fibrin was removed paying attention to avoid iatrogenic intestinal perforation. Two Drains were inserted, one of which was left in the pelvic cavity. Bladder catheter was placed in all cases. Nasogastric tube was also placed in all patients until return of bowel function. Temporary abdominal closure was performed with cutaneous abdominal closure with 4 stiches of Prolene 2. The patients also received 100 ml/h of 10% glucose administered daily throughout recovery period plus saline 1 L in 24 h. Ceftriaxone 2 gr once a day, Metronidazole 500 mg every 8 h and Ciprofloxacin 500 mg every 12 h were given. Antibiotic therapy was interrupted when sepsis was solved. No parenteral solutions were available in our hospital.

Haemoglobin levels were controlled at admission and through the recovery. 7/10 women needed blood transfusion to resume an acceptable Hb level. All ten women were re-operated every 48 h for peritoneal lavage. In the ward a daily peritoneal lavage through the drain tubes was performed with 2 L of crystalloid fluids. Laparostomy definitive closure was done when peritonitis was solved and bowel function was restored. Drain tubes were then removed.⁸ (treatment given explained in table 3)

Results

All patients underwent laparotomy for abdominal exploration. Incarcerated abdomen with fibrin covered ileus and free pus was seen in 10/10 cases. No uterus visible perforation was detected in women and therefore no uterus reparation was necessary. No hysterectomy was either performed since no sign of uterine injury or fragility was seen.

Number of re-laparotomy was $4,5 \pm 1,7$. No patients required intestinal resection. 3/10 patients died after the first treatment for respiratory distress.

Definitive abdominal wall closure was performed after the last peritoneal lavage to all patients. Drain tubes were removed afterward.

Table 3

Patient's treatments and outcomes

	M	F
Number of Laparotomies	$6 \pm 3,8$	4,5 1,7
Bowel resection	0/3	0/7
Uterine resection	/	0/7
Mean Volume of Saline per lavage	4 L	3,5 L
Deaths	0/3	3/7
Blood transfusion	2/3	5/7
Discharge day	$14 \pm 6,1$	$19 \pm 5,8$

Patients were discharged at $19 \pm 5,8$ days with stable Hb levels and White Blood Cell count. All patients were given metronidazole 500mg tablets after discharge. (results are described in table 3) .No early readmission happened in discharged patients. The mortality rate was 30%. Seven of the patients needed blood transfusion during hospitalization. None of the patients had bowel resection.

Discussion

Spontaneous diffuse peritonitis is a challenging clinical situation for the slow onset of the symptoms². Acute and sudden abdominal pain can be absent at the beginning and temperature can remain under 38 degrees and be inconstant. Diarrhea can be the only initial bowel function disorder. It might happen that patients refer to hospital only when bowel function is lost³ or when asthenia and weakness cannot be bear any longer. Explorative laparotomy in such cases is often the last diagnostic approach. Decision for laparostomy instead of a normal abdominal wall closure was made after ileus incarceration was noted¹¹. Intra-abdominal pressure was in fact high giving reason to the dispnea patients arrived with³.

Impossibility to close properly the abdominal wall and the need for operative second looks make laparostomy in our opinion mandatory.

Bowel perforation as intra-abdominal finding can be considered as an exclusion criteria for this kind

of approach. Clinical presentation in fact is quite different for that kind of patients and bowel incarceration has not time to take place. Untreated bowel perforation in our Northern Uganda experience lead to death within 48 h in healthy patients. Also if promptly diagnosed (the only survivable ones), peritonitis due to bowel perforation can be solved by bowel resection (or bowel suture), lavage and abdominal wall closure after drain tubes placement. The 3 cases of death happened after the first procedure for respiratory distress. Conditions at admission were very poor and oxygen saturation remained very low during the all surgical procedures.

Avoidance of iatrogenic intestinal perforation is a main factor in patients outcome according to our experience. We consider intestinal sutures or anastomosis to be at high risk of leaks in compromised and septic patients such as those undergoing laparostomic treatment.^{12,13}

We did not perform any uterine resection because of the intact aspect of the organs. In case of a compromised uterus nevertheless, isterectomy should be seriously taken into consideration. Blood transfusions, where possible, are necessary to correct anemia and to restore a proper tissue oxygenation. Infection rate detected in Northern Uganda surgical wards can be up to 55%. In our Surgical Ward over all wound infection rate was up to 42% in 2010, due above all to patients' behavior and pour aseptic environment. Patients per room could be up to 20 and isolation cannot be routinely done for high risk patients.

Antibiotic resistance is also becoming a serious problem in Uganda as a consequence of diffuse improper antibiotic prescription. Regardless of the conditions these patients were treated in, 7/10 patients could be discharged with clean abdominal wound, restored bowel function and no evidence of residual ongoing sepsis. The 30% mortality rate in this group can be related to the young age of the patients and to the fact that no bowel perforation was present¹⁴.

Conclusion

Spontaneous peritonitis can have a slow unset and admission to hospital can be seriously delayed. Laparostomic treatment of such cases can be an effective approach also in potentially infected environment. Avoidance of intestinal iatrogenic perforation is a main factor in patients outcome.

References

1. Vedral J, Antos F, Mares R. et al. Laparostomy as a part of intensive surgical care.. *Rozhl Chir.* 1993; 72(7):334-6.
2. Monneuse O, Tissot E, Gruner L, et al Diagnosis and treatment of spontaneous group A streptococcal peritonitis.. *Br J Surg.* 2010; 97(1):104-8.
3. Strauss E, Caly WR. Spontaneous bacterial peritonitis: a therapeutic update. *Expert Rev Anti Infect Ther.* 2006; 4(2):249-60. Review
4. Bölke E, Jehle PM, Schwarz A, Therapy of diffuse suppurative peritonitis with continuous peritoneal lavage. *Wien Klin Wochenschr.* 2002;114(15-16):709-16.
5. De Waele JJ, Leppäniemi AK. Intra-abdominal hypertension in acute pancreatitis. *World J Surg.* 2009; 33(6):1128-33.
6. Komarov NV, Bushuev VV, Maslagin AS. The use of laparostomy and drainage in treating peritonitis. *Vestn Khir Im I I Grek.* 1998;157(3):58-9
7. Jannasch O, Tautenhahn J, Lippert H, Meyer F. Temporary abdominal closure and early and late pathophysiological consequences of treating an open abdomen. *Zentralbl Chir.* 2011 Dec;136(6):575-84. Epub 2011 Mar 1
8. Campbell AM., Kuhn WP. Vacuum-assisted closure of the open abdomen in a resource-limited setting Ngwelezane Hospital, KwaZulu-Natal. *S Afr J Surg* 2010; 48(4):114-5.



9. Quyn AJ, Johnston C, Hall D, Chambers A, Arapova N, Ogston S, Amin AI. The open abdomen and temporary abdominal closure systems – historical evolution and systematic review. *Colorectal Disease*, 2012; 1463-1318JUL
10. Verdam FJ, Dolmans DE, Loos MJ, Raber MH, de Wit RJ, Charbon JA, Vroemen JP. Delayed primary closure of the septic open abdomen with a dynamic closure system. *World J Surg* 2011; 35(10):2348-55
11. Miller PR, Thompson JT, Faler BJ, Meredith JW, Chang MC. Late fascial closure in lieu of ventral hernia: the next step in open abdomen management. *J Trauma*. 2002; 53(5):843-9.
1. Schein M. Langenbecks. Surgical management of intra-abdominal infection: is there any evidence? *Arch Surg* 2002; 387(1):1-7. Epub 2002 Feb 7.
2. Willms A, GÜsgen C, Schreyer C, Becker HP, Schwab R. Prevention of small bowel fistulas during open abdominal treatment: lessons learned. *Zentralbl Chir*. 2011 Dec; 136(6):592-7. Epub 2011 May 11.
3. Anderson O, Putnis A, Bhardwaj R, Ho-Asjoe M, Carapeti E, Williams AB, George ML. Short- and long-term outcome of laparostomy following intra-abdominal sepsis. *Colorectal Dis*. 2011 Feb;13(2):e20-32. doi: 10.1111/j.1463-1318.2010.02441.x