

From damage control surgery to complex abdominal wall reconstruction

It is possible even in the elderly
in a Spoke Center?



Ann. Ital. Chir., 2023 94, 1: 95-98
pii: S0003469X22038623

Antonio De Matteis, Michele Sacco, Pasqua Napoletano, Stefano Pizzoleo, Paola Palazzo, Anna Angrisano, Salvatore Pungente, Domenico Lamacchia, Silvia Erario, Giovanni Bellanova

UOC Chirurgia Generale "D. Camberlingo" Francavilla Fontana, Italy

"Lavoro vincitore della Prima Edizione del Premio Carlo Picardi tenutasi a Francavilla Fontana il 16 giugno 2022"

From damage control surgery to complex abdominal wall reconstruction. It is possible even in the elderly in a Spoke Center?

AIM: To describe our Spoke Center experience in Damage Control Surgery (DCS) in a non traumatic patient and the possibility of delayed abdominal wall reconstruction (AWR).

Material of Study The case of a 73 years old Caucasian male treated with DCS for a septic shock due to a duodenal perforation and his clinical course till the abdominal wall reconstruction.

RESULTS: We made DCS with abbreviated laparotomy, suture of the ulcer and duodenostomy with a foley placed in right hypochondrium. Patients was discharged with a low-flow fistula and with TPN. After 18 months we made an open cholecystectomy and a complete abdominal wall reconstruction with Fasciotens Hernia System® adding a biological mesh.

DISCUSSION AND COMMENTS: Periodic training in emergency settings and in complex abdominal wall procedures is the right way to manage critic clinical case. Like Niebuhr's abbreviated laparotomy experience also in our case this procedure allows primary closure of complex hernias and is potentially less prone to complications than component separation methods. Unlike Fung's experience we didn't use negative pressure wound therapy system (NPWT) equally achieving good results.

CONCLUSIONS: Elective repair of abdominal wall disaster is possible even in elderly patients who have been treated by abbreviated laparotomy and DCS surgery. In order to obtain good results is fundamental to have a trained staff.

KEY WORDS: Damage Control Surgery (DCS), Giant incisional Hernia, Abdominal Wall Repair.

Introduction

Incisional hernia (IE) is a common late complication after abdominal surgery and its incidence is much more frequent (20%) in the first year after operation. In last we performed a great number of GAH repair. This increasing challenge causes a continuous development of new surgical technique for general surgeons. In GAH the abdominal vertical and lateral muscles are lateralized and lead to intestinal protrusion out of abdomen. This

critic set is impossible to resolve without tension of abdominal muscle and fascia. Abdominal wall reconstruction (AWR) of GAH is mandatory to avoid important complications and so general surgeons are called to attend training course to improve their ability in using of innovative device like Fasciotens. Niebuhr, Fung, Hees are some general surgeons that published their experience in using of innovative device. In this Case Report we described our experience in order to demonstrate that after DCS the use of innovative fascia-traction device is possible, sure and replicable.

Case Report

We described the case of a 73 years old male, heavy smoker suffering from type II diabetes, hypertensive heart

Pervenuto in Redazione Giugno 2022. Accettato per la pubblicazione Agosto 2022

Correspondence to: Antonio De Matteis (e-mail: andematteis87@gmail.com)

disease, AF and OBPC. He was been accepted in April 2020 at our emergency department affected by a severe septic shock for acute peritonitis caused by a duodenal perforation for unknown peptic disease. In his remote surgical history he was submitted to ulcero-raphy for perforated peptic ulcer. After a quick pre-surgery diagnosis we made DCS with short laparotomy, source control by the suture of the perforated gastric ulcer and duodenostomy by foley placed in right hypochondrium. During surgery an endoscopic evaluation of duodenal papilla was made by the site of duodenal perforation. Abdominal cavity was drained with 2 tubes and an open abdomen with skin closure was performed. Patient was admitted at our ward because he was considered a near to death patient and no indication to Intensive Care Unit (ICU) was made. Duodenostomy was managed with conservative approach and the severe malnutrition was corrected with Total Parenteral Nutrition (TNP). Three weeks after surgery the patient showed an acute respiratory disease associated to a liver failure caused by

ev antimycotic therapy and so was transferred to an ICU of an Hub Centre. After seven days, at the return in our department duodenostomy was converted in duodenal controlled fistula changing the foley with a laminar drain. One week before discharge an episode of partial evisceration was treated in ward, by a skin suture in local anaesthesia. Patient was discharged in a good condition with a low-flow fistula (near to 20cc of corpuscular liquid) with TNP by night and selected oral diet. The target after discharge was an elective reparation of the GAH. In April 2021 he was re-admitted in Emergency Department for a new episode of evisceration of ileum with partial necrosis (Fig. 1). An ileal resection with a new skin closure was performed. He was discharged after a week. In September 2021 our patient had a complex wall disaster (Fig. 2) and so we conduct a complete AWR with Rives Stoppa technique (Fig. 3) and using the Fasciotens Hernia System® (Fig. 4) to have a fascia-traction (Fig. 5) and so we complete the wall reconstruction using a PVDF mesh 15x25 cm (Figs. 6, 7).



Fig. 1



Fig. 3

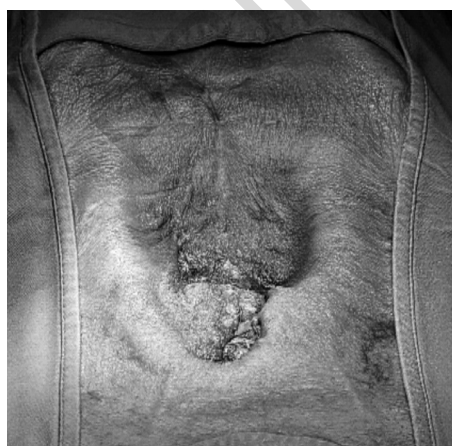


Fig. 2

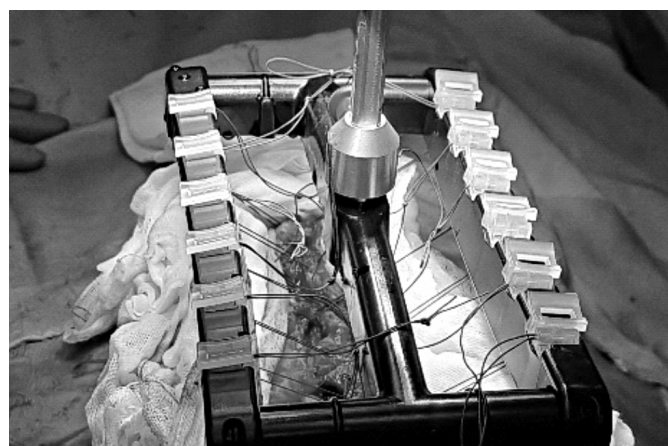


Fig. 4

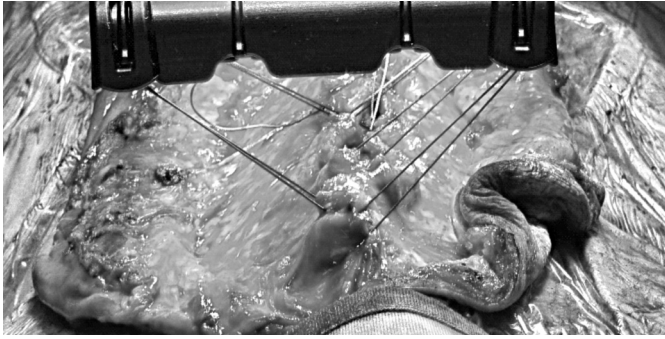


Fig. 5

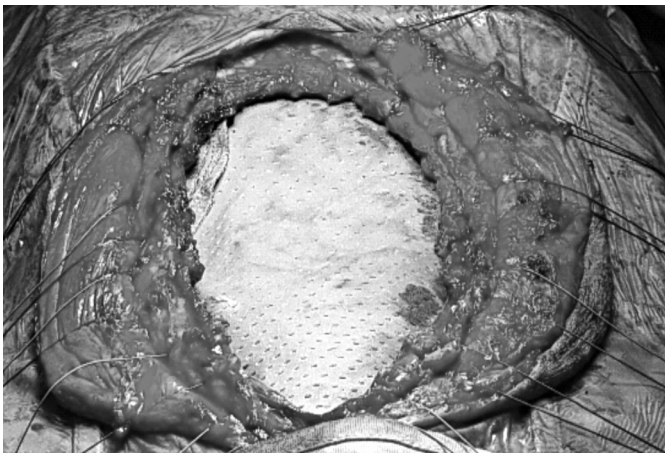


Fig. 6

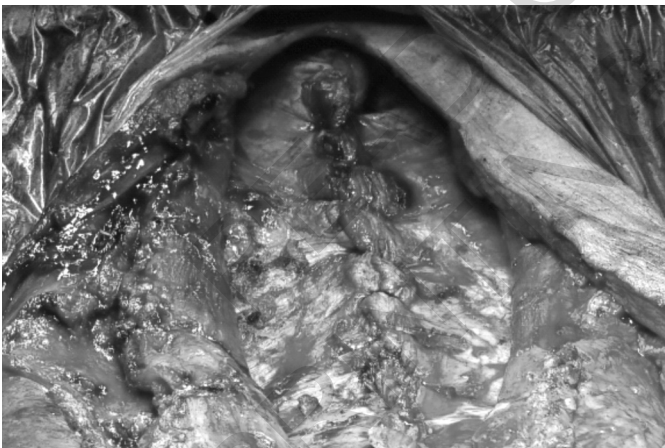


Fig. 7

Results

Thanks to Fasciotens System the diastasis of ventral muscles passed from 4-12-11 to 0-5-5 applying a vertical traction of 16 kg for 30 mins (Fig. 5). He was discharged in POD 6. CT abdomen after 18 months showed a normal abdominal wall and a good quality of life (Fig. 8).



Fig. 8

Discussion and Comments

AWR of GAH is mandatory to avoid important complications and so general surgeons are called to attend training course to improve their ability in using of innovative device like Fasciotens.

Increased fascial length is required for closure of the abdominal wall in reconstruction of complex hernias. Without sufficient fascia-traction the intra-abdominal pressure (IAP) increases after abdominal reconstruction. In our experience we gained a mean fascial length of 5 cm. Majumder et al. measured gains of 8.8 cm; Neibuhr measured gains of 9.8 cm. In Hees's group gains measured 7.8 cm.

Our patient didn't developed abdominal compartment syndrome and his postoperative IAP didn't increases up to 17 mmHg. In Neibuhr series IAP increases up to 20 mmHg without complications. In our case there was progressive normalization of IAP and at the discharge it measured 8 mmHg. Also Eucker et al. observed no cases of abdominal compartment syndrome after muscles stretching in AWR with Fasciotens.

Fung used a negative pressure wound therapy system (NPWT) achieving good cosmetic result. All Author that used fascia-traction devices added biological mesh in wall reconstruction. Few Author described ASR using Fasciotens after previous Damage Control Surgery (DCS).

Conclusion

In AWR the use of fascia-traction devices represents a good method to add at component separation procedure.

Fasciotens demonstrated to be useful in improving gain in fascial length without postoperative complications like abdominal compartment syndrome. Previous DCS doesn't represent a contraindication to AWR with Fasciotens. In order to obtain good results is fundamental to have a trained staff. A prospective multi-center study should be carried out to further evaluate long-term outcomes.

Riassunto

Il nostro Lavoro riporta la nostra esperienza nella ricostruzione elettiva di un disastro di parete addominale in un paziente di 73 anni precedentemente sottoposto a Damage Control Surgery per perforazione duodenale e conseguente stato settico. Trattandosi di un paziente con pluricomorbidità non è stato possibile ricostruire la parete addominale contestualmente alla laparotomia esplorativa per ulcera peptica. Si è optato per un timing operatorio differito di alcuni mesi. Dopo la risoluzione della fase acuta il paziente è stato sottoposto ad un intervento di resezione ileale in seguito a eviscerazione intestinale dovuta all'importante difetto di parete addominale anteriore. Con tecnica "skin closure" abbiamo ulteriormente rimandato la ricostruzione parietale. È stato possibile eseguire la alloplastica di parete sec. Rives-Stoppa grazie ad un sistema di trazione fasciale (Fasciotens) che ha permesso di ridurre la distanza dei margini muscolari della breccia erniaria e al contempo di scongiurare una sindrome compartimentale nel postoperatorio. Il nostro Centro Spoke è dotato di una equipe chirurgica sottoposta a training di ricostruzione di disastri di parete e questo approccio formativo ha permesso di instaurare una gestione multifasica e allo stesso contesto complessa di un paziente critico.

References

1. Niebuhr H, Aufenberg T, Dag H, et al: *Intraoperative fascial tension as an alternative to component separation. A prospective observational study*. Front Surg, 2021; 7:616669, Published 2021; 23, doi: 10.3389/fsurg.2020.616669.
2. Hees A, Willeke F: *Prevention of fascial retraction in the open abdomen with a novel device*. Case Rep Surg, 2020; 21:2020:8254804, doi: 10.1155/2020/8254804, PMID: 33145116, PMCID: PMC7599407.
3. Niebuhr H, Malaibari ZO, Köckerling F, Reinhold W, Dag H, Eucker D, Aufenberg T, Fikatas P, Fortelny RH, Kukleta J, Meier H, Flamm C, Baschleben G, Helmedag M: *Intraoperative fasziotraktion (IFT) zur behandlung großer ventraler hernien: Eine retrospektive analyse von 50 fällen: Intraoperative fascial traction (IFT) for treatment of large ventral hernias: A retrospective analysis of 50 cases*. Chirurg, 2022; 93(3):292-298, German, doi: 10.1007/s00104-021-01552-0, Epub 2021; 14, Erratum in: Chirurg, 2022; 22, PMID: 34907456, PMCID: PMC8894171.
4. Fung S, Ashmawy H, Kriegelstein C, Halama T, Schilawa D, Fuckert O, Hees A, Kröpil F, Rehders A, Lehwald-Tywuschik NC, Knoefel WT: *Vertical traction device prevents abdominal wall retraction and facilitates early primary fascial closure of septic and non-septic open abdomen*. Langenbecks Arch Surg, 2022; 11:1-9, doi: 10.1007/s00423-021-02424-1, Epub ahead of print, PMID: 35147749, PMCID: PMC8832079.
5. Eucker D, Rüedi N, Luedtke C, Stern O, Niebuhr H, Zerz A, Rosenberg R: *Abdominal wall expanding system. intraoperative abdominal wall expansion as a technique to repair giant incisional hernia and laparostoma. new and long-term results from a three-center feasibility study*. Surg Innov, 2022; 29(2):169-82, doi: 10.1177/15533506211041477, Epub 2021; 16, PMID: 34530655.
6. Eickhoff R, Guschlbauer M, Maul AC, et al: *A new device to prevent fascial retraction in the open abdomen: Proof of concept in vivo*. BMC Surg, 2019; 19(1):82, Published 2019; 8, doi: 10.1186/s12893-019-0543-3.