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ORIGINAL RESEARCH

UNINTENTIONAL POST-OPERATIVE OPEN ABDOMINAL WALL IN NON-TRAUMATIC PATIENTS: A MONOCENTRIC RETROSPECTIVE STUDY IN TUNISIA

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ABSTRACT
Introduction: Unintentional post-operative open abdominal wall (UPOAW) is a postoperative complication that consists of the early separation of the fascial layer after a primary closure of a laparotomy incision. This complication is associated with great morbidity and mortality. In this article, we studied the frequency of some of these known factors in our series and we briefly discussed the management of this complication.
Methods: It was a monocentric retrospective and descriptive study. We enrolled patients with UPOAW, admitted in the department of surgery in Habib Thameur hospital in Tunis (Tunisia), between January 2010 and December 2015.
We did not include traumatic patients. We excluded patients with missing data from medical records.
Results: The study was conducted on fifteen patients. Eight out of fifteen were men. Patients were aged between 41 and 76 years, with a mean age of 66.6 ± 11.4 years. In the past medical history, chronic obstructive pulmonary disease was noted in three patients, cirrhosis in three patients, diabetes in one patient and a history for laparotomy in one patient. Eight out of fifteen underwent emergent surgeries. Two out of these eight patients had haemodynamic instability throughout surgery. In the postoperative course, coughing was noted in three patients, abdominal distension from ileus in three patients, vigorous postoperative ventilation in two patients and vomiting in one patient. UPOAW was diagnosed between postoperative day zero and postoperative day twenty-one, with a mean time of diagnosis of 10.1 ± 6.6. All patients had immediate closure of the fascial layer. The surgeon used retro-fascial polyglactin mesh in three patients. Relaxing incisions were used in 5 patients. Morbidity after reoperation was 46.7 % (7/15) and mortality was 33.3 % (5/15).
Conclusion: UPOAW is a serious complication with high morbidity and mortality. Many factors can contribute to this complication. Every visceral surgeon is confronted with this problem at some point of his carrier and should apply the adequate treatment to his patients depending on his decision and experience. Strong level of evidence is needed to establish clear guidelines for the management of this heterogenous complication.

KEY WORDS: Unintentional post-operative open abdominal wall, evisceration, burst abdomen, fascial dehiscence, risk factors, management.

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INTRODUCTION
Unintentional post-operative open abdominal wall (UPOAW) also known as burst abdomen or evisceration or fascial dehiscence, is a postoperative complication that consists of the early separation of the fascial layer after a primary closure of a laparotomy incision. This complication is associated with great morbidity and mortality (1,2). There are many predisposing factors that can lead to this condition. In this article, we studied the frequency of some of these known factors in our series and we briefly discussed the management of this complication.

METHODS
It was a monocentric retrospective and descriptive study. We enrolled patients with UPOAW, admitted in the department of surgery in Habib Thameur hospital in Tunis (Tunisia), between January 2010 and December 2015.
We did not include traumatic patients. We excluded patients with missing data from medical records.
A predefined data sheet was used to collect the following information from medical records: sex, age, medical history, the type of operation and the degree of emergency, the technique of wound closure, post-operative course

(Factors raising intra-abdominal pressure, wound infection, intraperitoneal infection, laboratory blood tests, imaging…), management of the UPOAW, outcomes.
The data was fed into SPSS version 21 and analysed. The results of quantitative data are expressed as means ± standard deviation and of qualitative data as frequencies.

RESULTS

Our study included nineteen patients that were treated for UPOAW, in Habib Thameur hospital, Tunis in Tunisia, between January 2010 and December 2015. Four patients had missing data from their records, so they were excluded from the study. The study was conducted on fifteen patients.
Eight out of fifteen were men. Patients were aged between 41 and 76 years, with a mean age of 66.6 ± 11.4 years. In the past medical history, chronic obstructive pulmonary disease was noted in three patients, cirrhosis in three patients, high blood pressure in three patients, diabetes in one patient and a history for laparotomy in one patient.
Eight out of fifteen underwent emergent surgeries: three patients for secondary peritonitis, two for bowel obstruction, two for gastro-intestinal bleeding and one for mesenteric infarction. Two out of these eight patients had haemodynamic instability throughout surgery. The other seven patients underwent elective surgeries and it was for malignant tumour in five out of seven patients.
Fourteen patients had open surgeries and only one had an endoscopic surgery for cholelithiasis (UPOAW through the umbilical port-site incision on the postoperative day 2).
In the fourteen patients with open surgeries: ten had midline incisions, three subcostal incisions and one an inguinal incision.
Fascial closure was performed with number 1 calibre absorbable (polyglactin) braided suture in all the operations. Continuous sutures were used in fourteen operations and interrupted sutures in one operation.
In the postoperative course, coughing was noted in three patients, abdominal distension from ileus in three patients, vigorous postoperative ventilation in two patients and vomiting in one patient. In laboratory blood tests, anaemia was noted in seven patients, acute kidney failure in two patients and jaundice in two patients.
UPOAW was diagnosed between postoperative day zero and postoperative day twenty-one, with a mean time of diagnosis of 10.1 ± 6.6. The UPOAW was revealed by a subcutaneous abscess in two patients and entero-cutaneous fistulae in two patients. A computed tomography was performed in five patients, it revealed an intra-peritoneal abscess in one patient. The UPOAW was complete (With the dehiscence of the skin) with non-adherent bowel loops to the abdominal wall in five patients, and with adherent bowel loops in six patients. UPOAW was incomplete (Covered by the skin) with adherent bowel loops to the abdominal wall in three patients, and with non-adherent bowel loops in one patient.
All patients had reoperations. The mean time to reoperation was 15.9 ± 24.9. All patients had immediate closure of the fascial layer: with continuous suture in nine patients and interrupted suture in six patients. Closure was performed with number 1 calibre absorbable (polyglactin) braided suture in all the operations. The surgeon used retro-fascial polyglactin mesh in three patients. Relaxing incisions were used in 5 patients.
Morbidity after reoperation was 46.7 % (7/15) and mortality was 33.3 % (5/15).

DISCUSSION

UPOAW is a serious postoperative complication that can worsen the prognosis of an already fragile patient (1,2). It is a catabolic state that resembles an extensive burn with fluid and protein losses (proportional to the surface area of the fascial dehiscence and the complete or incomplete character of the UPOAW), and excessive calories and nutrients consumption for the wound healing process (3). It also increases the formation of gastrointestinal fistula, adhesions and intra-abdominal abscesses. This complication is responsible for high morbidity and mortality that does not seem to decrease (4).
Many factors can contribute to UPOAW. These factors can be subdivided chronologically into three groups: pre-operative, per-operative and post-operative. We listed these factors in table I.

Table I: Predisposing factors of UPOAW* and their physiopathological effect (5–11)

	Factors	Physiopathology
Pre-operative (5–7)	Age > 70	Impaired wound healing
	Obesity	Raised intraabdominal pressure
	Diabetes	Angiopathy
	Renal failure	Uraemia induced Malnutrition
	Jaundice	Malnutrition associated to biliary obstruction
	Anaemia	Low oxygen level in the wound
	malnutrition	Deficiency in nutrients
	Corticosteroids	Catabolic effect
	Ascites	Raised intraabdominal pressure
	Indication of surgery: Emergency	Haemodynamic instability
	Indication of surgery: Tumours	Malnutrition
	Indication of surgery: Peritonitis	Raised intraabdominal pressure
Per-operative (8–11)	Type of incision	Midline incision at greater risk than transverse incision due to lateral tension of large muscles (8)
	Technique of fascial closure	One layer better than multiple layers due to higher wound bursting strength (9) Small stitches better than large stitches (8) Continuous sutures better than Interrupted sutures due to tension equilibration along the incision (10)
	Suture material	Slowly absorbable versus non-absorbable: No difference (11)
Post-operative (5–7)	Coughing	Raised intraabdominal pressure
	Vomiting	Raised intraabdominal pressure
	Ileus	Raised intraabdominal pressure
	Vigorous post-operative ventilation	Raised intraabdominal pressure
	Intraabdominal infection	Raised intraabdominal pressure
	Wound infection	Impaired wound healing

* Unintentional post-operative open abdominal wall.

Many authors developed risk score to predict the risk of wound dehiscence after laparotomy. Webster et al created a score system called "the abdominal wound dehiscence risk index". Scores of 11-14 are predictive of 5% risk of dehiscence while scores of >14 predict 10% risk (7). In 2010, van Ramshorst et al introduced another risk model with high predictive value of abdominal wound dehiscence (5). These scores omitted completely per-operative factors despite their importance. In fact, in the early stages of wound healing, the wound is dependent on the suture line (12). Thereby, the suture technique is important to prevent UPOAW. Per-operative factors depend mainly on the judgmental ability and decision making of the surgeon. In our study, all the patients had immediate primary closure with rapidly absorbable (polyglactin) braided sutures. One patient could demonstrate the important role of the technical aspect as a risk factor. She was a 70-year-old woman, with no medical history. After an elective surgery and closure of the fascial layer with continuous suture, this patient had an UPOAW on postoperative day zero secondary to suture break. Apart from age, she had no other pre-operative or post-operative risk factors.

The European Hernia Society has made some recommendations for primary closure of abdominal wall incisions to decrease the incidence of incisional hernia (8). Most of these recommendations are also valid for the prevention of UPOAW. We should stress on the fact that these recommendations are for elective surgery and no recommendations were given on how to close emergency laparotomy incisions due to the lack of data.

UPOAW is a severe and heterogenous complication. Its management depends mostly on the surgeon's decision. Until today, there is no evident strategy to treat this complication. Manuel et al proposed an algorithm depending on the complete or incomplete character of the wound dehiscence, bowel adherence to the abdominal wall and the presence of entero-atmospheric fistula (13). The aim of the treatment is to treat an intraabdominal infection, frequently associated with UPOAW, and closure of the fascial defect as quickly as possible without increasing intraabdominal pressure. Many techniques have been suggested and can be subdivided into conservative and operative management. Conservative treatment relies mainly on saline-soaked gauze dressings and negative pressure wound therapy(14). As for operative management, primary closure with various suture techniques, closure with application of relaxing incisions, synthetic and biological meshes and tissue flaps were used (14). Lately, techniques used for intentional (planned) acute post-operative open abdominal wall(15), the so called "open abdomen", were also implemented in the UPOAW (14).

CONCLUSION

UPOAW is a serious complication with high morbidity and mortality. Many factors can contribute to this complication. Every visceral surgeon is confronted with this problem at some point of his carrier and should apply the adequate treatment to his patients depending on his decision and experience. Strong level of evidence is needed to establish clear guidelines for the management of this heterogenous complication.

AUTHORS' CONTRIBUTIONS

Conception and design of study: Hasnaoui A, Zaafouri H.

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SPONSORSHIP

Declared none.

COMPETING INTERESTS

The authors declare no competing interests.

REFERENCES

[1] Pavlidis TE, Galatianos IN, Papaziogas BT, Lazaridis CN, Atmatzidis KS, Makris JG, et al. Complete dehiscence of the abdominal wound and incriminating factors. Eur J Surg Acta Chir. 2001 May;167(5):351–354; discussion 355.

[2] Wahl W, Menke H, Schnütgen M, Junginger T. Fascia dehiscence: cause and prognosis. Chir Z Alle Geb Oper Medizen. 1992 Aug;63(8):666–71.

[3] Fabian TC, Croce MA, Pritchard FE, Minard G, Hickerson WL, Howell RL, et al. Planned ventral hernia. Staged management for acute abdominal wall defects. Ann Surg. 1994 Jun;219(6):643–53.

[4] van't RMT, De Vos Van Steenwijk PJ, Bonjer HJ, Steyerberg EW, Jeekel J. Incisional hernia after repair of wound dehiscence: incidence and risk factors. Am Surg. 2004 Apr;70(4):281–6.

[5] van Ramshorst GH, Nieuwenhuizen J, Hop WCJ, Arends P, Boom J, Jeekel J, et al. Abdominal wound dehiscence in adults: development and validation of a risk model. World J Surg. 2010 Jan;34(1):20–7.

[6] Eke N, Jebbin NJ. Abdominal wound dehiscence: A review. Int Surg. 2006 Oct;91(5):276–87.

[7] Webster C, Neumayer L, Smout R, Horn S, Daley J, Henderson W, et al. Prognostic models of abdominal wound dehiscence after laparotomy. J Surg Res. 2003 Feb;109(2):130–7.

[8] Muysoms FE, Antoniou SA, Bury K, Campanelli G, Conze J, Cuccurullo D, et al. European Hernia Society guidelines on the closure of abdominal wall incisions. Hernia J Hernias Abdom Wall Surg. 2015 Feb;19(1):1–24.

[9] Bucknall TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. Br Med J Clin Res Ed. 1982 Mar 27;284(6320):931–3.

[10] Richards PC, Balch CM, Aldrete JS. Abdominal wound closure. A randomized prospective study of 571 patients comparing continuous vs. interrupted suture techniques. Ann Surg. 1983 Feb;197(2):238–43.

[11] Bloemen A, van Dooren P, Huizinga BF, Hoofwijk AGM. Randomized clinical trial comparing polypropylene or polydioxanone for midline abdominal wall closure. Br J Surg. 2011 May;98(5):633–9.

[12] Rath AM, Chevrel JP. The healing of laparotomies: review of the literature. Hernia. 1998 Sep 1;2(3):145–9.

[13] López-Cano M, Pereira JA, Armengol-Carrasco M. "Acute postoperative open abdominal wall": Nosological concept and treatment implications. World J Gastrointest Surg. 2013 Dec 27;5(12):314–20.

[14] van Ramshorst G, H Eker H, Harlaar J, J J Nijens K, Jeekel J, F Lange J. Therapeutic alternatives for burst abdomen. Vol. 19. 2010. 111 p.

[15] Scott BG, Feanny MA, Hirshberg A. Early definitive closure of the open abdomen: a quiet revolution. Scand J Surg SJS Off Organ Finn Surg Soc Scand Surg Soc. 2005;94(1):9–14.