Journal of Visceral Surgery (2016) xxx, xxx—xxx

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

ORIGINAL ARTICLE

Feasibility of selective non-operative management for penetrating abdominal trauma in France

G. Goin[a,*], D. Massalou[b], T. Bege[c], C. Contargyris[d], J.-P. Avaro[a], G. Pauleau[a], P. Balandraud[a]

[a] *Department of General and Thoracic Surgery, Laveran Military medical Center, HIA Laveran, 34, boulevard Laveran, CS 50004, 13384 Marseille cedex13, France*
[b] *Department of general surgery, pôle urgences, Universitary Hospital Saint-Roch, Sophia Antipolis University, Nice, France*
[c] *Department of General surgery, Universitary Hospital Nord, Marseille, France*
[d] *ICU Department, Laveran Military medical Center, Marseille, France*

KEYWORDS
Penetrating trauma;
Abdominal;
Non-operative management

Summary
Introduction: In France, non-operative management (NOM) is not the widely accepted treatment for penetrating wounds. The aim of our study was to evaluate the feasibility of NOM for the treatment of penetrating abdominal traumas at 3 hospitals in the Southeast of France.
Methodology: Our study was multicentric and retroprospective from January, 2010 to September, 2013. Patients presenting with a penetrating abdominal stab wound (SW) or gunshot wound (GSW) were included in the study. Those with signs of acute abdomen or hemodynamic instability had immediate surgery. Patients who were hemodynamically stable had a CT scan with contrast. If no intra-abdominal injury requiring surgery was evident, patients were observed. Criteria evaluated were failed NOM and its morbidity, rate of non-therapeutic procedures (NTP) and their morbidity, length of hospital stay and cost analysis.
Results: One hundred patients were included in the study. One patient died at admission. Twenty-seven were selected for NOM (20 SW and 7 GSW). Morbidity rate was 18%. Failure rate was 7.4% (2 patients) and there were no mortality. Seventy-two patients required operation of which 22 were NTP. In this sub-group, the morbidity rate was 9%. There were no mortality. Median length of hospital stay was 4 days for the NOM group and 5.5 days for group requiring surgery. Cost analysis showed an economic advantage to NOM.
Conclusion: Implementation of NOM of penetrating trauma is feasible and safe in France. Indications may be extended even for some GSW. Clinical criteria are clearly defined but CT scan criteria should be better described to improve patient selection. NOM reduced costs and length of hospital stay.

* Corresponding author.
E-mail addresses: goingeraldine@yahoo.fr (G. Goin), massalou.d@chu-nice.fr (D. Massalou), thierry.bege@ap-hm.fr (T. Bege), contargyris@hotmail.com (C. Contargyris), avarojp@orange.fr (J.-P. Avaro), ghislainpauleau@yahoo.fr (G. Pauleau), paulbalandraud@gmail.com (P. Balandraud).

http://dx.doi.org/10.1016/j.jviscsurg.2016.08.006
1878-7886/

Background

Non-operative management of penetrating trauma has gained acceptance in recent decades, initially for stab wounds and somewhat later for selected gunshot wounds. Recently, the Eastern Association for the Surgery of Trauma (EAST) practice management committee has specified the indications and details of implementation for NOM for penetrating abdominal injuries [1].

NOM has become the standard of care for abdominal blunt trauma. However, in Europe and in particular in France, it is still an issue of debate for treating penetrating trauma especially gunshot wound.

The aim of this study is to evaluate the feasibility of NOM as a treatment modality for penetrating abdominal trauma in France.

Methodology

This is a multicentric study on penetrating abdominal trauma including data from the University Hospital Center Nord and the Laveran Military Medical Center in Marseille and the University Hospital Center in Nice. Data were retrospective from January, 2010 to December 2010, and prospective from January, 2011 to September, 2013. The primary purpose of this study was to assess the feasibility of NOM for penetrating abdominal trauma. Secondary endpoint was to measure cost analysis.

The single inclusion criterion was penetrating trauma involving the thoraco-abdominal area, except isolated thoracic injury.

Penetrating injury was attested by clinical examination and local wound exploration by a surgeon at the emergency department. Non-inclusion criteria were superficial, non-penetrating wounds.

Studied data are summarized in Table 1.

Patients were managed following the Practice management guidelines for selective non-operative management of penetrating abdominal trauma, edited by the EAST (Fig. 1) [1].

Patients with signs of peritonitis (severe tenderness, guarding or rebound tenderness) and/or hemodynamic instability (hearth rate [HR] > 120/min and systolic blood pressure [SBP] < 100 mmHg despite resuscitative therapy with pressive amines) were managed with emergent surgery. In the time of admission every patient, even with hemodynamic instability, had chest X-ray to eliminate pneumo- or hemothorax in case of missed thoraco-abdominal wound and focused assessment sonography for trauma (FAST) to help in the decision of immediate surgery or CT scan. Patients considered hemodynamically stable and without signs of peritonitis underwent CT scan with intravenous contrast too. Evisceration and consciousness disorder were criteria for surgery but often realized after a CT scan.

Initial NOM was proposed if the CT scan did not show any intra-abdominal injury requiring a surgical procedure. In this case, the patients were admitted to a surgical unit, kept on nil per os (NPO), with intravenous therapy and followed with serial physical exams every 4 hours. If CT scan showed signs of injured intra-abdominal organs requiring a surgical procedure, the patient was immediately treated surgically.

The treatment decision between operative and non-operative management was ultimately made by the senior surgeon on duty.

Complications, assessed according to Clavien classification, were considered as minor when grade I and II, and major when III and IV [2].

NOM failure was defined as a hemodynamic or clinical worsening evolving at least 4 hours after the admission and requiring a surgical procedure.

Operative procedures were classified in two groups: therapeutic or non-therapeutic laparotomies (NTL). Among NTL, there were intra-abdominal injuries, which had not required any surgical procedure, and ''blank laparotomies'', where no intra-abdominal injuries were found. The same

Table 1 Demographic characteristics and admission variables.

Informations gathered at hospital admission
Demographics: age, sex
Weapon type
Vital signs: heart rate, arterial blood pressure (mmHg), temperature (°C), arterial oxygen saturation (%), Glasgow score, pain score
Physical examination findings: placement and number of entry and exit wounds, severe tenderness, evisceration, bleeding, associated lesions
Labwork: hemoglobin (g/dL), platelet count (mm^3), TP (%), fibrinogin (g/L)
Results of FAST
Results of thoracic X-ray
Body scanner with intravenous injection of contrast
Free liquid
Free air
Active bleeding
Solid organ injury
Hollow viscous injury
Retroperitoneal impairment
Surgical patients
Type of incision
Preoperative observations
Nature of intervention (therapeutic or non-therapeutic)
Postoperative complications according to Dindo-Clavien
Length of hospital stay
Non-surgical patients
Need for surgery
Length of hospital stay

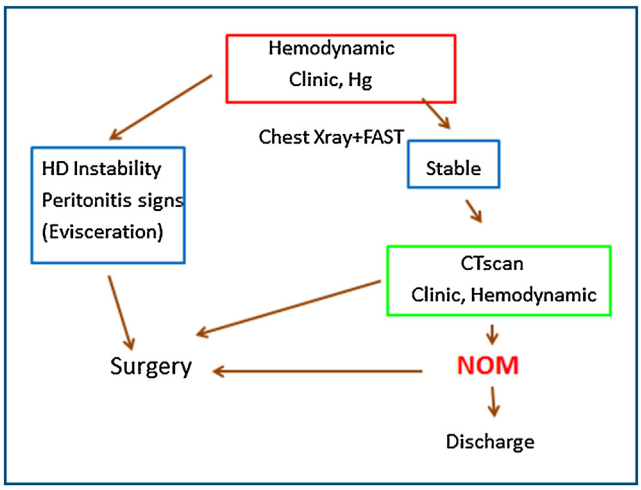

Figure 1. Protocol.

Please cite this article in press as: Goin G, et al. Feasibility of selective non-operative management for penetrating abdominal trauma in France. Journal of Visceral Surgery (2016), http://dx.doi.org/10.1016/j.jviscsurg.2016.08.006