

DIAGNOSIS AND MANAGEMENT OF ABDOMINAL TRAUMA

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Abstract: *The optimal management of patients with abdominal injuries has been debated for decades. A descriptive study was performed and analyzed in order to have a base for a better understanding of the management of abdominal trauma patients. In this study, 100 patients admitted to Clinical Emergency County Hospital of Brasov, with blunt and penetrating abdominal trauma were analyzed. A total of 58 patients were successfully treated by conservative management without further complications. This study demonstrated that non-operative management is a possible and efficient solution for abdominal injuries. However, further research is required to determine conditions of such management and to confirm findings.*

Key words: *abdominal trauma, non-operative management.*

1. Introduction

Over the last few years, abdominal trauma management has been largely debated [10, 11], [16]. Nonoperative management (NOM) has been the major change in care of trauma patients, and it has been used for the first time in the 1970's for blunt abdominal trauma [16]. Until then, laparotomy was the standard of care in most abdominal trauma. This type of surgery led to a higher morbidity and mortality rate [2]. It has been demonstrated multiple times that abdominal trauma can be managed non-operatively [7], whilst other sources debate that NOM is not sufficient [19].

The benefits of NOM include lower hospitalization costs, shorter duration of

stay and fewer complications like infection, pleurisy, pneumothorax and intestinal occlusion [5], [20]. The main condition for NOM in abdominal trauma is to have a hemodynamic stable patient [20]. In this type of patients, NOM has proven to be successful in 90% of cases [12, 13]. On another hand, the lesion has to be described in a very precise manner. The use of CT combined with echography of the traumatized area proved to be an efficient tool in grading with precision the abdominal lesion extension [8]. On another hand, NOM can also generate complications: intraabdominal sepsis, late hemorrhage and intraabdominal hematomas which can lead to abscesses and secondary lesions [4].

Trauma scores also play an important

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role in establishing the operative or non-operative approach of patients with abdominal trauma [3], [9].

Management of these trauma patients requires further description and investigation.

2. Objectives

We performed a retrospective study of all patients with blunt and penetrating abdominal trauma, who were admitted to Clinical Emergency County Hospital of Braşov, from July 2014 – December 2015.

For this purpose, the following parameters were analyzed: frequency of traumatized patients, gender and age distribution, the frequency of affected organs, frequency of hemoperitoneum, types of management used and length of hospital stay. The present paper aims to identify proper management for all patients with abdominal trauma.

3. Materials and Methods

We performed a retrospective analysis of patient files to identify those who were hospitalized for abdominal trauma.

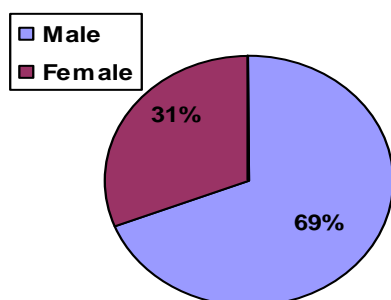


Fig. 2. Gender distribution in patients with abdominal trauma

All types of abdominal trauma were included in the study: penetrating and non-penetrating. We selected a number of 100 patients. Descriptive data was collected and statistical analysis was executed using Excel.

4. Results and Discussions

A total of 100 patients were identified as hospitalized for abdominal trauma from 2014 to 2015, 12 patients with penetrating and 88 with non-penetrating abdominal trauma.

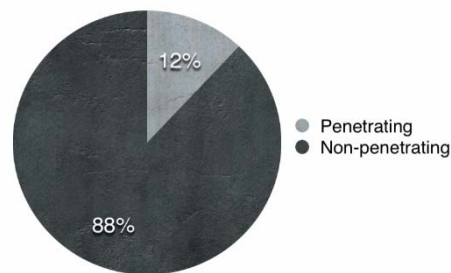


Fig. 1. Distribution of abdominal trauma based on type of injury

Demographic distribution by gender and age is also analyzed (Figures 2-3).

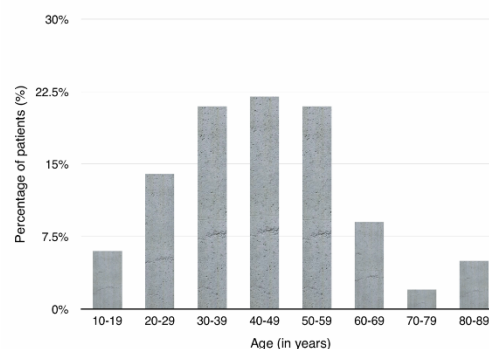


Fig. 3. Age distribution in patients with abdominal trauma

A significant difference between genders is noted, abdominal trauma being more frequent in males between 30-39 years-old and 50-59 years-old whilst in woman the highest incidence rate occurs between ages 40-49. All genders combined, abdominal trauma occurred most frequently around ages 30-59. In his study, Harbrecht showed that patients over 55 years old had a greater mortality rate, and also failed NOM

more frequently than younger patients [1].

Also in older patients, the morbidity and mortality is increased regardless of management (NOM or surgery) [1].

Road traffic accidents (26%) were the most frequent mechanism of injury, followed by fall from same height (21%), fall from height (16%), stabbing (14%), aggression (11%) and others (12%) (Figure 4).

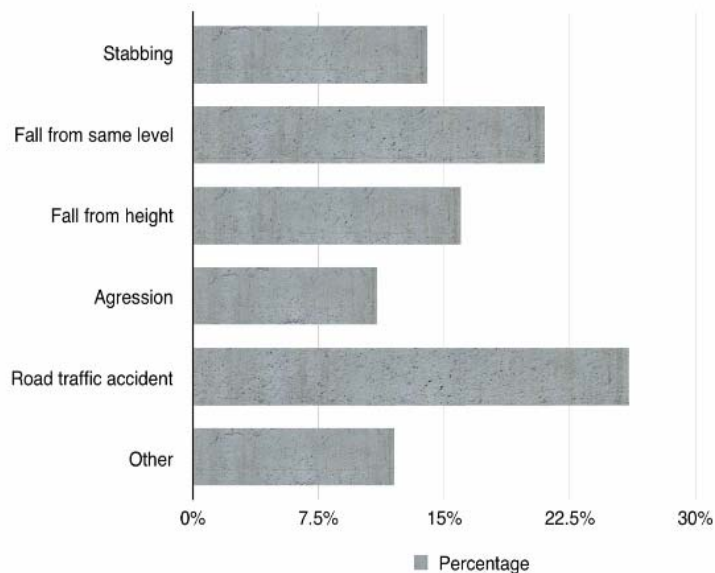


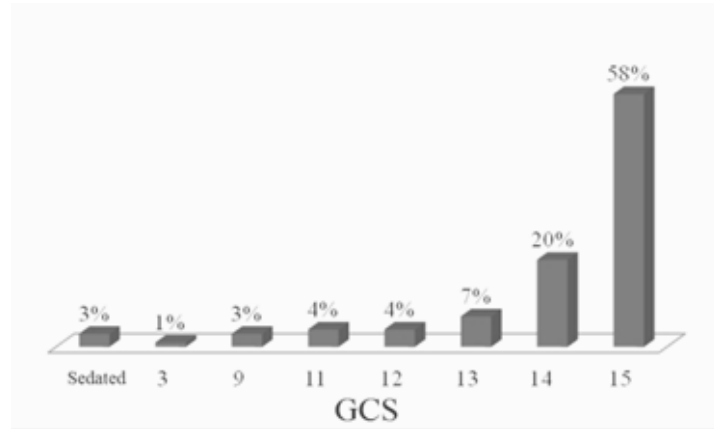
Fig. 4. *Mechanism of injury in abdominal trauma patients*

The spleen was the most injured organ (30%) followed by the liver (15%) and kidneys (5%); 51 patients had no visceral lesions. This data shows a decline of organ injury rate with non-penetrating abdominal trauma.

In 58 patients, the Glasgow coma score

was 15 which demonstrated a majority of patients with abdominal trauma had an adequate level of consciousness.

GCS is not a predictor for the success of NOM. Many studies showed that NOM failure rate is the same in patients with moderate and severe cerebral injury [18].

Fig. 5. *Glasgow coma scale*

In a majority of patients, pulse rate on hospitalization ranged between 60-99 bpm (Table 1). Only 2 patients had a pulse between 40-59 bpm. There was a strong

correlation between pulse rate >120 bpm, found in 6% of patients and the failure of NOM ($p < 0.001$)

Table 1

Pulse rate on hospitalization

Pulse rate [bpm]	No. of patients
40-59	2
60-79	35
80-99	43
100-119	14
120-139	6

On another hand, systolic blood pressure values were situated around 110-149 mmHg (Table 2). An elevated systolic

pressure (over 149 mmHg) was noted in 11 out of 100 patients.

Table 2

Systolic blood pressure values in hospitalized patient

Systolic blood pressure [mmHg]	No. of patients
70-89	5
90-109	14
110-129	35
130-149	35
150-169	9
170-189	1
190-209	1

Systolic blood pressure (SBP) lower than 110 mmHg, was correlated with failure of NOM ($p = 0.0651$).

Correlation between SBP and NOM

Table 3

Correlation coefficient r	0.4315
Significance level	P=0.0651
95% Confidence interval	-0.0283 to 0.7406

In terms of complications, 58% of patients developed hemoperitoneum as a result of blunt abdominal trauma or visceral lesion and transfusions were necessary for 27% of patients. Most patients were successfully treated by NOM, 58% (Figure 6).

High grade splenic injuries, who require transfusion (>1unit of blood) are more likely to fail NOM. In these cases, surgical treatment should be considered in the first place [7], [15].

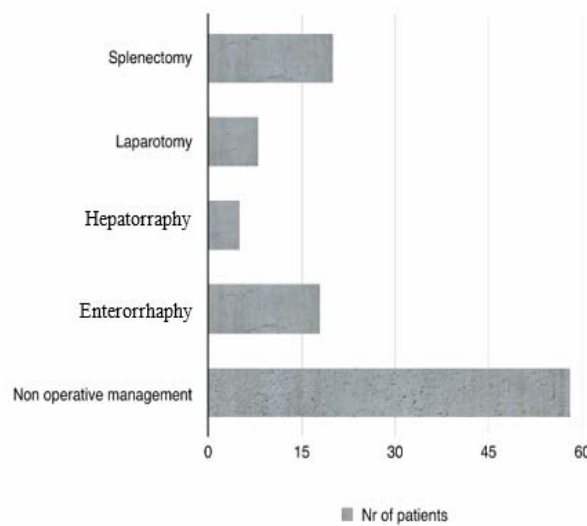


Fig. 6. *Management of abdominal trauma*

Most patients had an ASA score of 1 (Figure 7). An ASA score of 4 is correlated with failure of NOM.

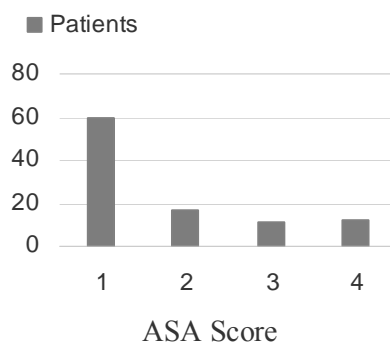


Fig.7 *ASA score*

The longest length of hospital stay was 17 days, and was required in 4 patients. Most patients required a shorter duration

of hospitalization, between 1-4 days (Figure 8).

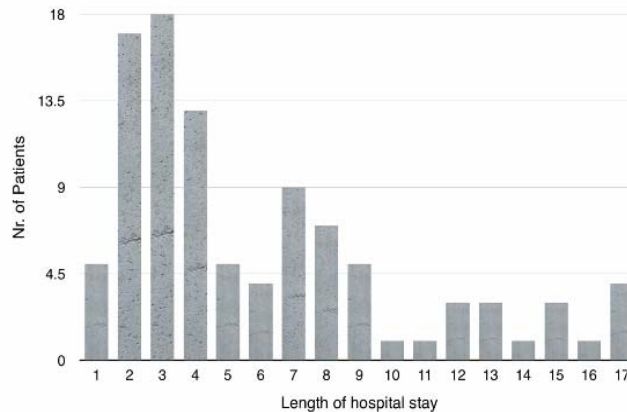


Fig. 8. *Length of hospital stay in abdominal trauma patients*

For the past decades, conservative management of abdominal trauma injuries has been discussed and accepted as a possible solution to avoid additional complications to a polytraumatized patient [4,17].

The hemodynamic stability represents the key factor for the success of NOM. If the patient is unstable, emergency laparotomy is required [6].

In this study, non-penetrating abdominal traumas were the most frequent type of injury.

In literature, hemoperitoneum is mostly associated with penetrating abdominal trauma [14].

Hemoperitoneum was present in 58 patients even if a majority of cases were not caused by penetrating injuries.

5. Conclusions

In the selected group of 100 patients, 58 were treated successfully by NOM with a mean hospitalization duration of 5 days.

In this study, 30 patients presented with splenic injuries, making the spleen the most vulnerable organ in abdominal trauma.

At admission 58 patients had hemoperitoneum quantified by echography and computer tomography.

Surgery, was required in 42% of patients hospitalized for abdominal trauma. This includes splenectomy, enterorrhaphy, hepatorrhaphy or other types of hemostasis (electric coagulation, sealant patch).

Low systolic blood pressure at admission (<110mmHg) is correlated with failure of NOM.

Pulse rate >120bpm is also a predictor of NOM failure. All patients with pulse more than 120 bpm and SBP lower than 110mmHg underwent emergency surgery.

The presence of hemoperitoneum did not always predict the need of surgery. A large hemoperitoneum is also accompanied with hemodynamic instability, so emergency surgery is always necessary.

In conclusion, NOM with close monitoring is the treatment of choice for hemodynamically stable trauma patients.

This paper acknowledges the need to further assess conditions of nonoperative management of abdominal trauma patients.

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