

# Care Plan for the Polytraumatized Patient with Hypovolemic Shock

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## ABSTRACT

A clinical case of a polytraumatized patient admitted to the resuscitation unit is presented. The patient is a man over 65 who have been hit in the back by a vehicle that was receding. The emergency team that comes to the place the event makes a first assessment and decides the transfer to the resuscitation unit for stabilization of the patient. Nursing professionals in the unit perform an assessment by Marjory Gordon functional patterns, identify nursing diagnoses and establish a care plan. Finally, they manage to solve to a great extent the health problems presented during their stay in the unit of 21 days after their transfer to the trauma plant.

**Keywords:** Hypovolemic shock; Polytraumatized; Reanimation unit; Care plan

**Abbreviations:** Abbreviated Injury Scale (AIS); Injury Severity Score (ISS)

## INTRODUCTION

Multiple trauma is defined as the coexistence of multiple lesions, of which an injury or a combination of them pose a life-threatening risk to the victim [1-3]. However, although this definition has been in use for years, there is no consensus to identify patients with multiple lesions, in fact there are several synonyms in the literature as a critical patient with trauma, patients with multiple lesions, a multiple trauma patient or "polytrauma" [4].

Therefore, the assessment scales represent an important tool to identify the severity of the injuries of patients with multiple injuries. For this there are several scales, including the Injury Severity Score (ISS) of 1974 based on the sum of the squares of the individual severity of the three most affected injuries measured with the Abbreviated Injury Scale (AIS), is the scale most used in practice in Europe and the United States. A cut-off point has been established to define a major trauma with an ISS value of  $\geq 16$  points [2-4].

Previous studies showed that the subjective definition of multiple trauma can differ inter and intra-hospital [1,4], and the need arose to agree on a definition that took into account measurable objective parameters to predict mortality in patients with multiple trauma. The definition of Berlin in 2014, the most recent, includes physiological and anatomical parameters with the classification of the severity of the AIS injury  $\geq 3$  in at least two lesions, ISS  $\geq 16$  points and at least one of the following five physiological parameters:

hypotension (systolic blood pressure  $\leq 90$  mmHg), acidosis (excess of base  $\leq -6.0$ ), coagulopathy (international normalized index  $\geq 1.4$ /partial thromboplastin time  $\geq 40$  s), level of consciousness (Glasgow comma scale  $\leq 8$ ) and age ( $\geq 70$  years) [2-5].

Polytraumatized patients experience mortality rates of 20%, and severe trauma represent the first cause of mortality in the first decades of life in developed countries, due to traffic accidents in most cases [4,6].

Mortality due to severe trauma is divided into three peaks, the first peak of preclinical mortality (in first minutes), the second peak between the first and the fourth hour and the third peak occurs late until weeks later. Approximately in the first 24 hours, 90% of deaths are caused by primary trauma due to brain or spinal injuries and severe hemorrhages, while secondary mortality is caused by multi organ failure, sepsis or respiratory failure, which are some of the complications most common during hospitalization [2].

The location of the lesions has an impact on the clinical course of the polytraumatized patient, specifically the lesions at the level of the thorax and the long bones; the clinic is determined by hemorrhagic shock, coagulopathy, hypothermia and soft tissue injuries.

The initial treatment of polytraumatized patients is essential, detecting and treating life-threatening injuries following the ABCDE rules for initial assessment. The treatment focuses initially on the protection of the respiratory tract and management of the respiratory tract, relieving pneumothorax and hemothorax for example (A-airway, B-Breathing), control of bleeding and volume

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therapy (C-Circulation), the state of consciousness (D- Disability) and the protection of secondary organ damage (E-Exposure).

Subsequently, the clinical course of the patient must be considered, until achieving a hemodynamic stability that allows surgical intervention to repair the lesions. For this it is necessary that the patient meets the requirements of hemodynamic stability, lactate, diuresis, respiratory function, and coagulation with parameters within normal, as well as body temperature [2].

Therefore, polytraumatized patients represent a challenge for health care, and require the joint interdisciplinary work of emergencies, resuscitation unit, intensive care, surgery and traumatology, as well as subsequent rehabilitation, composed of a team of health professionals, doctors, nurses, etc. that take care of the patient to guarantee the quick recovery and the smaller number of possible sequels [7].

The initial action of a polytraumatized is a determining factor; therefore nursing activities are fundamental, from a correct assessment, the application of prescribed treatment and specific care to ensure the survival and decrease of sequelae of the trauma patient. Therefore, the aim of this paper is to show, through a clinical case of a polytraumatized patient with a hypovolemic shock clinical course, the care plan carried out by the nurses of the resuscitation unit.

## CASE REPORT

A male over 65 years of age entered the resuscitation unit of a public management hospital after assessment and initial treatment in the emergency department due to high-energy impact when he was facing away from a truck that was reversing, he was trapped under the vehicle, falling to the ground face. He reports pain in the left hip, left arm and abdomen.

### Primary assessment in the emergency department

- A. Permeable airway.
- B. Eupneic, with partial oxygen saturations correct. Spontaneous ventilation with normal thoracic mobility. Normal respiratory auscultation.
- C. No signs of macroscopic active bleeding. Tendency to hypotension 84/49 mmHg and heart rate (HR) of 92 bpm (beats per minute).
- D. Conscious, reactive pupils. Glasgow 14-15. Presents territory of hypoesthesia in L4-L5. He does not have episode amnesia.
- E. He does not have open fractures. Excoriations in the lower left limb (MII) at the peroneal malleolus level.

Receives initial treatment by the emergency department, with administration of saline 0.9% at high infusion speed and immobilization by spinal table and vacuum mattress.

A complex fracture of the pelvis with signs of instability from the radiological point of view and fracture of the right ilio-pubic ramus, with separation of the osseous ends, is evidenced by diagnostic imaging with a computed tomography (CT).

The patient enters the unit with the following clinical judgment: hypovolemic shock in a polytraumatized patient.

During his stay in the resuscitation unit, a complete assessment

was made based on Marjory Gordon's functional patterns [8] to establish the appropriate care plan for the case. The care provided in the clinical case is carried out by the nurses in the unit assigned to each patient's shift. Such care includes assessment, diagnosis, interventions, results and evaluation of the care plan [9].

### Valuation by functional patterns of marjory gordon

First, the nurses perform an assessment of the patient's condition, through the 11 functional health patterns of Marjory Gordon in which objective and subjective data of the patient are taken into account, which serves to organize the information and subsequently define a diagnosis nurse, according to the risk or real problems detected [8,9].

**Pattern 1: Perception and health management:** A patient admitted to the resuscitation unit after a high-energy impact from being hit by a truck with pelvic fractures.

As a patient's personal history, he suffers from poorly controlled diabetes mellitus type 2, diagnosed 2-3 months ago in treatment with metmorphine and insulin therapy. Arterial hypertension of 6-8 years of evolution in treatment. Dyslipidemia in treatment with statins. No known allergies.

Upon admission to the unit, the following pharmacological treatment is prescribed to maintain stable hemodynamic status: Enoxaparin 20 mg, vitamin K, furosemide 10 mg, albumin 20%, noradrenaline to maintain >75 mmHg the mean arterial pressure, metamizol 2 gr and paracetamol 1 g every 8 hours. Insulin regular human subcutaneous every 4 hours according to protocol. Broad spectrum antibiotherapy.

He is also informed that he will be operated on in the next few days to stabilize the pelvic fracture he presents.

On the 6th day of admission to the unit, pre-anesthesia preparation is performed for the surgical intervention.

**Pattern 2: Nutritional – Metabolic:** Before the surgery, the patient follows an absolute diet with fluid therapy with hydroelectrolytes. After continuous surgery with fluid therapy and absolute diet, later enteral feeding with nasogastric tube.

Mucous membrane evaluation: bruises on the chest and abrasions on the lower left limb. He presents generalized edema with a positive water balance of 11 liters. With edema in scrotum and flictenas in lower limbs after a few days.

Without fever, but on the fifth day of admission, fever and an increase in blood leukocytes appear, so antibiotic prophylaxis is prescribed, which begins in the operating room.

**Pattern 3: Elimination:** Forced diuresis with furosemide. Clear urine. Urinary catheter carrier. Due to the antibiotherapy after the intervention, he suffers severe diarrhea and a rectal probe is placed. He presented the abdomen distended and with hydro-aerial noises.

**Pattern 4: Activity-exercise:** Cardiovascular state: the patient enters with sinus rhythm but tends to hypotension, which is why on numerous occasions the administration of vasoactive drugs with Noradrenaline is used, with which the patient is stabilized with an average blood pressure of 60 mmHg.

Upon admission, the patient presented low hematocrit and hemoglobin, and polytransfusions were made of a total of 9

hematite concentrates and 4 fresh frozen plasma.

**Respiratory state:** During the surgical intervention he is connected to mechanical ventilation with orotracheal intubation, which is then associated with nosocomial pneumonia, with a large amount of mucus with frequent aspirations of it.

Valuation of mobility and daily activity: bedding from the entrance for multiple fractures, a pelvic gallon is placed.

He needs help with hygiene since he is a bedridden patient.

**Pattern 5: Sleep-rest:** Due to the pain of the traumatism suffered, the patient did not have a good rest so he was administered analgesics and sedatives to ensure sleep.

**Pattern 6: Cognitive-perceptive:** Upon admission, the patient is conscious and oriented. From admission until surgery, the patient reported pain in the injured parts. He also presented states of agitation and confusion. Analgesics and sedation were necessary.

**Pattern 7: Self-perception-self-concept:** The patient in recent years has felt the decline of his health with the diagnosis of different pathologies, and this accident has made him feel very vulnerable.

**Pattern 8: Role-relations:** His work activity is already retired. The patient lives and receives daily visits from his wife and son. They show themselves collaborators.

**Pattern 9: Sexuality-reproduction:** He does not report any problems in this pattern during admission.

**Pattern 10: Coping-tolerance of stress:** The patient does not have amnesia from the accident. He is agitated, confused and scared.

Subsequently, effective communication is difficult to establish due to the state of sedation that occurs after the intervention. At times the patient was agitated and confused, and physical measures were taken and Midazolam 5 mg was administered to reassure him.

**Pattern 11: Values-beliefs:** Neither patient nor family has referred any desire to profess their faith during the stay in the unit.

### Care plans

Table 1 shows the main results derived from the present clinical case: diagnostic label, care planning and follow-up/evaluation after its execution, elaborated according to standardized nurse taxonomy (NANDA, NIC, NOC) [10-12]. The results indicators detail the starting point and the expected results after the provision of care by nurses in the unit.

There are several results that are resolved to achieve the expected result, in terms of results observed during the stay of the patient in the unit: 0601 Water balance, 0504 Renal function, 0411 Response of mechanical ventilation: adult and 2102 Pain level.

Table 1. NANDA diagnostics with the corresponding NOC, NIC and activities

00004 Risk of infection related to fluid retention.			
NOC Outcomes	Scale from serious (1) to uncommitted (5)		NIC Intervention
(0204) Consequences of immobility: Physiological.			(740) Care of the bedridden patient.
Indicators	Initial	Last	Place the patient on an anti-decubitus mattress.
	Value	Value	
20408 Urinary retention	2	4	
20409 Fever	During the patient's entry into the unit.		(3590) Surveillance of the skin. Observe in each shift if there is redness, extreme heat, edema or drainage of the skin or mucous membranes. Evaluate in each morning shift the state of the incision area, if necessary, proceed to change the dressing and cure the incision site. Monitor the condition of the skin, on the days of his admission, there appear blisters in the lower limbs, and a daily pattern of cures is initiated, and protections are placed on the heels.
00026 Excess fluid volumes related to compromised regulatory mechanisms manifested by generalized edema.			
NOC Outcomes	Scale from seriously compromised (1) to uncommitted (5)		NIC Intervention
(0601) Water balance.			(2100) Hemodialysis therapy
Indicators:	Initial	Last	Registration of vital signs every hour. Start hemodialysis according to optional order.
60110 Ascitis	Value	Value	Monitor blood pressure, pulse, respirations, temperature and patient response during dialysis. Adjust the filtration pressures to extract an adequate amount of liquid.
60102 Average blood pressure	1	4	
60115 Thirst			
(0504) Renal function.			(1056) Enteral feeding by nasogastric tube.
Indicators:	Initial	Last	
50402 Balance of intake and diuresis	Value	Value	Observe if there is feeling of fullness, nausea and vomiting. Before each intermittent feeding, check for residues. Observe if there are signs of edema or dehydration. Control the intake / excretion of liquids.
50406 Urine color: normal.	2	5	

50411 arterial pH between 7.35-7.45	During the patient's entry into the unit.		(0590) Monitoring of urinary elimination. Placement of Foley probe No. 16, connected to a urine bag with a meter. Measure diuresis every hour and balance at 12 o'clock at night. Start the water restriction protocol since signs of edema in lower and upper limbs are observed.
<b>00033 Impaired spontaneous ventilation related to intraoperative blood loss of 2500 cc manifested by decreased arterial oxygen saturation</b>			
<b>NOC Outcomes</b>	<b>Scale from seriously compromised (1) to uncommitted (5)</b>		<b>NIC Intervention</b>
(0411) Mechanical ventilation response: adult			(3300) Mechanical ventilation management: invasive. Ensure that the fan alarms are connected.
Indicators:	Initial	Last	Check all fan connections regularly.
41131 Lung infection	Value	Value	Observe if there is a decrease in expiratory volume and an increase in inspiratory pressure.
	2	5	
41112 Oxygen saturation	During the patient's entry into the unit.		
41111 arterial pH			Control the amount, color and consistency of pulmonary secretions, and document the results periodically. (3160) Aspiration of the airways. Aspiration of the airways before nebulization and whenever necessary. Monitor the patient's oxygenation status neurological status and hemodynamic immediately before, during and after the suction Aspirate the oropharynx after finishing the tracheal suction. Clean the area around the tracheal stoma after finishing the tracheal aspiration, as appropriate.
<b>00132 Acute pain related to polytrauma manifested by verbalization of the patient and facial expression of pain</b>			
<b>NOC Outcomes</b>	<b>Scale from Serious (1) to always proven None (5)</b>		<b>NIC Intervention</b>
(2102) Pain level.	Initial	Last	(2260) Management of sedation
Indicators:	Value	Value	Review other medications that the patient is taking and check the absence of contraindications for conscious sedation.
210208 Restlessness	2	5	Determine baseline vital signs, oxygen saturation, electrocardiogram, height and weight. Check the level of consciousness according to the protocols of the center.
210211 Heart rate			Ensure that emergency resuscitation equipment is readily available.
210206 Facial expression			
(2109) Level of discomfort.			
Indicators:	Initial	Last	Canalization of a large-caliber peripheral venous line.
210901 Pain	Value	Value	Administer medication according to medical prescription or protocol (with care) and according to the patient's response.
210903 Anxiety.	1	5	
210903 Groans.			
210914 Restlessness.	During the patient's entry into the unit.		(2210) Administration of analgesics. Choose the appropriate analgesic or combination of analgesics when prescribing more than one according to the type and intensity of pain. Monitor vital signs before and after the administration of narcotic analgesics, with the first dose or if unusual signs are observed. Evaluate the efficacy of the analgesic at regular intervals after each administration, but especially after the initial doses, and should also be observed if there are signs and symptoms of adverse effects.

## DISCUSSION

The plan of care was based on the Zero Bacteremia protocols, diabetes control in the critical unit, care of the patient bedridden with mechanical ventilation and the polytraumatized patient. Thanks to them, the recovery of the patient in the resuscitation unit was achieved 21 days after admission. The evolution of the patient is observed since his admission, with pre-surgical and postoperative interventions, resolving the complications that occurred during his stay in the unit. From hypovolemic shock, typical of the clinical course of severe trauma [2], as well as the appearance of nosocomial pneumonia post surgical intervention for the use of mechanical ventilation is a subgroup of nosocomial pneumonia that occurs more than 48 to 72 hours after tracheal intubation and affects between 10% and 20% of patients with mechanical ventilation [13].

The proposed NANDA diagnoses have been resolved or progressively improved during their stay in the unit, objectifying each day with the NOC indicators, and is discharged to the traumatology unit.

The patient is transferred to the traumatology unit, where he will continue with his care focused on the trauma suffered, conscious and oriented, carrying urinary foley catheter and nasogastric tube for enteral feeding. Delayed nosocomial pneumonia has been resolved after antibiotic therapy protocol. The retention of liquids and generalized edema has improved aiming an adequate water balance. Spontaneous ventilation with nasal glasses without the need for mechanical ventilation. Pain has been controlled due to analgesic treatment.

The main limitation of the present study is that derived from the analysis of a single clinical case. Therefore, we do not expose a representative sample of the population, therefore the clinical results obtained can not be extrapolated. However, the initial objective of applying a care plan for a polytraumatized patient with hypovolemic shock is met, and is susceptible to replication.

## CONCLUSIONS

This clinical case serves to illustrate a prevalent reality in clinical practice, such as the patient's multiple trauma since traffic accidents are very common throughout the world, and the intervention of a disciplinary team is emphasized to resolve the case as soon as possible and with the minor sequelae, the nursing professional having a very important role, since it autonomously establishes a plan of care adapted to each patient.

## ETHICAL APPROVAL

Not applicable.

## AUTHOR CONTRIBUTION

All authors are participated in the interpretation and reporting of the study's outcomes.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

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