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Case study of a user with diagnosis of superior vena cava syndrome due to mediastinal neoplasm

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SUMMARY

Introduction: Superior vena cava syndrome is a serious condition generated by the obstruction of blood flow. It can be generated by extrinsic pressure or by invasion. Nursing care for these patients focuses on reacting to the clinical response, depending on the severity of the patient's health status. **Objective:** Present a care proposal focused on the patient's health status. **Methodology:** A case study was conducted using the nursing process, according to the typology of Marjory Gordon's functional health patterns in order to detect the patient's primary human responses. Nursing diagnoses were prioritized according to the NANDA-I Taxonomy II and nursing care plans were prepared based on clinical judgments, establishing outcomes and interventions according to NOC-NIC taxonomies. **Case presentation:** A 62-year-old patient enters the emergency room and is hospitalized for probable pneumonia. After the diagnostic tests, it is determined that the patient suffers from superior vena cava syndrome due to mediastinal neoplasm and is subsequently transferred to Internal Medicine. **Conclusions:** The five stages of the nursing process were applied, reflected in the positive progress of the patient. When early identification of factors altering a patient's health status is lacking, the health-illness process and subsequent care of a critically ill patient is negatively affected.

Key words: Nursing process; superior vena cava syndrome; mediastinal neoplasm; gastrostomy; case study (DeCS; BIREME).

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INTRODUCTION

The nursing process is defined as a systematic method of solving problems to provide nursing care to individuals, families, or communities. It is the basis for nursing duties and can be applied to any field of health care or education, in any theoretical or conceptual frame of reference, and within the context of any nursing philosophy[1]. The objective of the nursing process is to identify the health status of the patient and/or community, as well as real and potential problems, in order to establish care plans for the identified needs and perform nursing interventions to solve them, which requires critical thinking to achieve the correct realization[2].

The case study is based on the description of a circumstance in an environment, taken in its context, and studying it in order to analyze how the phenomena of interest both manifest and evolve. The case is described as relevant according to the feasibility to explain a phenomenon where the context is vital. It is relevant for nursing since one of the components involved in the nursing metaparadigm is the environment and its affections on the individual within the health-illness process.

The case study is of interest for nursing because it allows for reflection and analysis on clinical situations that can be used as sources of learning, as well as proposals for improvement, impacting positively the care given to the patient [3].

The Superior Vena Cava Syndrome is a serious clinical scene due to the obstruction of the blood flow of the superior vena cava directed to the right atrium, which can be generated by extrinsic pressure or by invasion. Its diagnosis is practically clinical in nature, characterized by specific symptoms such as dyspnea. Of equal importance are the findings related to the physical examination, the main findings being facial edema and venous distention of the neck next to the chest wall. Its development usually is attributed to a malignant cause in 90% of cases[4].

The diagnosis of mediastinal neoplasm is made based on clinical testing.

1.Sixty percent of the patients do not present symptoms and seek medical attention due to the discovery of a radiographic abnormality.

2.There are respiratory symptoms such as irritative dry cough or spitting up sputum, dyspnea, chest pain, stridor, calcium fragments, blood due to erosion of the tumor or mass in the airways.

3.Superior vena cava syndrome due to deterioration in the emptying of the veins of the head, neck, and the upper limbs. If the obstruction is fast, it predisposes to the appearance of venous engorgement, edema, and cyanosis in the head, neck, trunk, and upper limbs.

4.Horner syndrome: due to involvement of the 6th cervical and 1st thoracic branches, where miotic pupils and upper eyelid ptosis can be seen, sometimes accompanied by enophthalmos and disorders of hydration or temperature of the affected side of the face.

5. Febrile syndrome, that can develop up to sepsis, as in pathologies related to lymphoma, infectious mass due to mycobacteria, fungi or bacteria, necrosis or infection of the mass or infection in a region far from the compression, which ends in the development of pneumonia, abscess and pulmonary suppuration syndrome, with infectious secretions and bad odor.

6. Other signs and symptoms: tracheal stridor, cardiac arrhythmias, chylothorax, dysphonia, dysphagia, odynophagia, compression of spinal cord, arteries and other veins independent of the superior vena cava, pericardial effusion, heart failure, and Pancoast syndrome.

7. Identification by tumor markers: increase of anti-acetylcholine receptor antibodies, alpha fetoprotein, and beta fraction of human chorionic gonadotropin[5].

The main causes of mediastinal neoplasm are: non-small-cell lung cancer (NSCLC) in most cases, in second place small-cell lung cancer (SCLC), and Non-Hodgkin's lymphoma (NHL). Other malignant tumors of minimal incidence that may occur are thymoma, mediastinal germ cell tumors, mesothelioma, and metastasis[4].

The purpose of this case study is to present a proposal of care for a user whose medical diagnosis is the superior vena cava syndrome due to mediastinal neoplasm, post-op gastrostomy, who underwent the Nursing Process according to the typology for assessment of Gordon's functional health patterns.

METHODOLOGY

The Internal Medicine sector of a second level public health institution conducted the case study. The methodology of the nursing process was according to the typology of Marjory Gordon's functional health patterns. For data collection, a family member was questioned as the patient's conditions did not permit direct questioning, and the information obtained was compared to the information in the clinical file.

The approach was made through the nursing process, which is made up of 5 stages: assessment, diagnosis, planning, execution, and evaluation. Nursing diagnoses were identified according to the NANDA-I taxonomy II. After that, nursing care was planned according to the NOC-NIC taxonomies; the expected results were established according to the established interventions. Likewise, both a bibliographic and scientific article review was conducted to analyze the information obtained from the patient and thus obtain a clearer picture of the patient's health status.

CASE PRESENTATION

Background information before admission
A 62 year old man, being a resident of Hermosillo, Sonora, entered emergency services by himself, describing symptoms synonymous with dysphagia and dysphonia as well as febrile peaks, for which reason it was decided to admit him for possible pneumonia. Prior to his hospitalization, the patient visited a doctor's office complaining of heartburn and slight tightness in the chest, which was treated however no improvement occurred.

As a diagnostic method, a CT Scan and blood tests were conducted. He was later transferred to the Internal Medicine sector with the diagnosis of superior vena cava syndrome due to mediastinal neoplasm.

During the nursing assessment, relatives of the patient were interviewed due to the critical condition and consciousness status of the patient.

Personal background

Pathological background and treatments received: family member denies chronic diseases.
Non-pathological: scheme of vaccination incomplete, denies having allergies.
Hereditary-Family: mother died from peritonitis at age 7; father died due to bleeding in the lower digestive tract at age 65; brother deceased at age 55 due to stomach cancer.

Medical indications

Parenteral solutions:
- Parenteral nutrition n7 from 2000 ml to 41.6 ml/h
- 200 ml 0.9% NaCl solution + 200 mg of Midazolam at 25.0 ml/h
- 60 ml 0.9% NaCl solution + 2 mg of Fentanyl at 12 ml/hrs
- 200 ml PFC every 6 hours (10 am, 4 pm, 10 pm, 4 am)

Medication:
- Furosemide 20 mg (2ml) I.V every 8 hrs (10 am, 6 pm, 2 am)
- Omeprazole 40 mg (diluted in 10 ml S.F.) I.V every 24 hours (10 am)
- Dexamethasone 4 mg (1 ml) I.V c / 24 h (12 pm)
- Ertapenem 1 gram (Diluted in 100 S.F.) I.V. 24 hours (12 pm)
- Folic acid 1 mg (10 ml) S.G. every 24 hours (10 am)
- Sucralfate 1 gram (10 ml) S.G. every 6 hours (6 am, 12 pm, 6 pm, 12 am)

Assessment and documentation by Marjory Gordon's functional health patterns

Health Perception-Health Maintenance Pattern

Before his hospitalization, he was in good health but, according to a family member, in the last month his health had deteriorated considerably due to weight loss, generalized fatigue, and respiratory distress. He related that he has been smoking, on average, six cigarettes a day since the age of 18, and he also consumes alcoholic beverages occasionally at a rate of 2 liters. There is no presence of chronic degenerative diseases. He goes to medical consultation every six months. His home has equipment and furniture that meets basic needs as expressed by the family member. This pattern was considered dysfunctional.

Nutritional-Metabolic Pattern

He is a large, well-built patient, dark complexion, exhibiting the presence of edema with Godet sign in upper limbs; he has caries in 20 of 28 teeth, halitosis, lesions with bleeding in the oral cavity and labial edema due to orotracheal tube. He has a body mass index of 29.04 kg/m2 (overweight); however, in the last month he lost approximately 14 kg. He has increased peristalsis of 25 x', hyper-sounds, pre-prandial abdominal perimeter of 118 cm and postprandial of 122 cm. He has functional gastrostomy without evidence of infection in the insertion area, with enteral nutrition of liquefied diet of 220 ml three times a day, plus N7 parenteral nutrition of 2000 mL for 48 hrs. Normothermic. Consumption of 946 ml during the 5-hour shift (Enteral route: 220 ml, parenteral: 726 ml), with a tendency to hyperglycemia.

Sub-hydrated teguments, he presents a Stage 2 pressure ulcer in sacrococcygeal region, of approximately 4 cm in length, in proliferative phase, which is covered with gauze, without evidence of infection.

The laboratory tests results revealed leukocytosis and neutrophilia and anemia (Table 1), related to the disease based on mediastinal neoplasm as established by the literature[4]. As mentioned, this pattern is dysfunctional.

Elimination pattern

The patient has a functional bladder catheter, with urination of 58.4 ml per hour, with diuresis of 0.64 ml/kg/h (oliguria) for a total of 292 ml during the shift, with a light yellow appearance. The urinary meatus is intact. He has constipation (10 days without bowel movement) and insensible losses of 225 per shift (90 kg x 0.5 x 5 hours) and positive water balance of + 429 ml.

According to lab tests, the patient has hyposthenuria (Table 2) related to fluid retention (urea 29 mg/dl, creatinine 0.61 mg/dl) (Table 2), which indicates an increase in the glomerular filtration rate of 153 ml/

Table 1. Results of lab tests of the nutritional-metabolic pattern

TEST	REFERENCE VALUE	RESULTS OF THE PATIENT
Blood Biometry (10/08/16)		
Type and Rh factor		O+
Leukocytes	4.6-10.2	12.9 10^3/uL
Erythrocytes	4.20-6.40	2.99 10^6/uL
Hemoglobin	12.2-18.1	8.3 g/dL
Hematocrits	36-52	26.7
Platelets	150-500	136 10^3/uL
Neutrophils	45.0-70.0%	85.6%
Lymphocytes	15.0-45.0%	5%
Blood Chemistry		
Glucose	75-110 mg/dL	96

Source: Clinical file

Table 2. Tests results of the elimination pattern

TEST	REFERENCE VALUE	RESULTS OF THE PATIENT
Urine Test (10/08/16)		
Color		Light yellow
Specific Density	1010-1.030 g/L	1.005 g/l
PH	5-6.5	5
Leukocytes		Negative
Nitrites		Negative
Proteins	Negativo	Negative
Glucose	Negativo	Negative
Ketones	Negativo	Negative
Urobilinogen		Normal
Bilirubins		Negative
Blood		Negative
Epithelial cells		Scarce
Bacteria		Scarce
Red blood cells		0.1
Mucous filaments		Scarce
Urates		Scarce
Biochemistry (10/8/16)		
Urea	16.6-48.5	29
Creatinine	0.7-1.2 mg/dL	0.61

Source: Clinical file

min (140-62 x 90/75 x 0.61). Therefore, this pattern was considered dysfunctional.

Activity and exercise pattern

Patient under assisted-controlled mechanical ventilation with the following parameters: respiratory rate of 12 x' with spontaneous ventilations (1-2x'), PEEP 7 cm H2O, ratio I:E of 1:2.5, VTE 580 and FiO2 of 50%. Lung fields with presence of bilateral rales in pulmonary apices, with adequate thoracic expansion, SaO2 of 95%. The patient has bilateral jugular engorgement. Blood pressure was 117/80 mmHg (PAM: 92), heart rate of 82 x', rhythmic, capillary filling of 3s in peripheral limbs. The patient has central venous access in the right femoral vein of three lumens, permeable, without evidence of infection, installed 16 days ago.

Alterations in arterial blood gases are observed, which indicates the presence of respiratory acidosis (Table 3); moreover, there is an alteration in ventilation/perfusion in the O2 supply, Kirby index of 169 (PaO2 = 76 / FiO2 45% * 100).

EKG shows HR of 84 x', rhythmic, with P pulmonale, from V1 to V3, shows QRS with R prima for blocking of right pulmonary branch, related to pulmonary disease. Elongated coagulation times (T.P. 18 s, T.P.P. 45.8 s). Plateletopenia 136,000 platelets (Table 3). Therefore, this pattern was considered dysfunctional.

Dream-rest pattern

This pattern was not assessed due to the patient's state of health.

Cognitive- perceptive pattern

The patient is under deep sedation with a score of -4 according to the RASS scale.
The patient has a pupillary diameter of 2 mm (miosis) with minimal reaction to light due to infusion with opioids.
Therefore, the pattern is considered dysfunctional.
Self-perception and self-concept pattern
This pattern was not assessed due to the patient's state of consciousness.

Role-Relations Pattern

The patient lives with his stepson; he is a widower, and has a good relationship with his stepson.
Sexuality-Reproduction Pattern
The patient has no children and his sex life is unknown. Intact type I mamma. He has complete genitalia without infection, absent of cremasteric reflex, and the perianal region is intact. Therefore, this pattern is considered functional.

Coping-stress tolerance pattern

This pattern was not assessed due to the patient's state of consciousness.

Values and beliefs pattern

This pattern was not assessed due to the patient's state of consciousness.

Table 3. Lab tests results about the activity-exercise pattern

TEST	REFERENCE VALUE	RESULTS OF THE PATIENT
Arterial Blood Gases (10/08/16 11:27 hours)		
O2 partial pressure	75-100 mmHg	76 mmHg
CO2 partial pressure	35-45 mmHg	49 mmHg
PH	7.35-7.45	7.40
HCO3 normal	22-26 mEq/L	23 mEq/L
FiO2	-	45%
Coagulation (10/8/16)		
Thrombin time	11.5-15.2	18
INR		1.27
Partial thromboplastin time	20.0-40.0	45.8

Source: Clinical file

Nursing diagnoses from NANDA-I [6] according to the assessment framework of the 11 Marjory Gordon's functional health patterns.	
Functional health patterns	***Nursing Diagnoses***
Activity-Exercise	DOMAIN 11: Safety / Protection; CLASS 02: Physical Injury (00031) Ineffective cleaning of airways r/c artificial airway (endotracheal tube) and accumulation of bronchial secretions m/p respiratory adventitious sounds (bilateral rales)
Activity-Exercise	DOMAIN 03: Elimination and Exchange; CLASS 04: Respiratory Function (00030) Deterioration of gas exchange r/c imbalance in perfusion ventilation m/p abnormal arterial blood gases (hypercapnia - PaCO2 = 49 mmHg, respiratory acidosis)
Nutritional-Metabolic	DOMAIN 11: Safety / Protection; CLASS 02: Physical Injury (00047) Deterioration of tissue integrity r/c mechanical factors (friction, pressure, immobilization m/p damage and tissue destruction (UPP grade 2 in the sacrococcygeal region of approximately 4 cm)
Nutritional-Metabolic	DOMAIN 11: Safety / Protection; CLASS 02: Physical Injury. (00045) Deterioration of the oral mucosa r/c mechanical factors (endotracheal intubation) m/p lesions with oral mucosa bleeding, labial edema
Elimination	DOMAIN 02: Nutrition; CLASS 05: Hydration (00026) Excess fluid volume r/c regulatory mechanisms compromised m/p edema, positive water balances, hyposthenuria (Urine density 1.005 g/l)
Elimination	DOMAIN 03: Elimination and Exchange; CLASS 02: Gastrointestinal Function (00196) Dysfunctional gastrointestinal motility r/c medications (sedatives) and enteral nutrition (malnutrition), immobility, treatment regimen m/p abdominal distention, change in intestinal noises (hyperactive), stool elimination decreased or no elimination.
Activity-Exercise	DOMAIN 11: Safety / Protection; CLASS 02: Physical Injury (00206) Risk of bleeding c/d coagulopathy (anemia) (hematocrit 26.7), plateletopenia (136 000 platelets), erythropenia (erythrocytes 2.99 10^6 /µl)
Health Perception and Maintenance	DOMAIN 11: Safety / Protection; CLASS 01: Infection (00004) Risk of infection c/d break in the skin (gastrostomy, central venous catheter, UPP) and invasive procedures

Care plan

DOMAIN 03: Elimination and Exchange	*CLASS 04: Respiratory Function*
(00030) Deterioration of gas exchange r/c imbalance in perfusion ventilation m/p abnormal arterial blood gases (hypercapnia - PaCO2 = 49 mmHg, respiratory acidosis).	
OBJECTIVE: Improvement of the gas exchange of the patient after nursing and the interdisciplinary group interventions during the inpatient days of the patient.	
DOMAIN 02: Physiological Health	CLASS: E Cardiopulmonary
EXPECTED RESULTS (NOC): 0402 Respiratory state: Gas exchange. DEFINITION: Alveolar exchange of CO2 and O2 to maintain arterial blood gas concentrations [7].	

INDICATORS	***TARGET SCORE***		***MEASURING SCALE: Deviation from 1 to 5***				
	MAINTAIN AT	INCREASE TO	1	2	3	4	5
40209: Partial pressure of carbon dioxide in arterial blood (PaO2))	3	5	Severe	Substantial	Moderate	Slight	No deviation
40208: Partial pressure of oxygen in arterial blood (PaO2)	5	5					
40211: O2 saturation	4	5					
440205: Restlessness	4	5					

INTERVENTIONS (NIC) / ACTIVITIES [8]	***SCIENTIFIC FOUNDATION***
3350 Respiratory Monitoring - Monitor frequency, rhythm, depth and effort of the breaths. - Listening to lung sounds after each treatment. -- Record changes in SaO2, CO2 and changes in arterial blood values. -- Monitor secretions. 1913 Acid-Base Management - Place the patient in a position that promotes optimal perfusion ventilation balance (semi fowler). - Consult the specialist about the handling of the ventilator and the possible change of ventilatory parameters (increase expiratory time - decrease respiratory rate). - Monitor the determinants of the tissue oxygenation (partial pressures, saturation and hemoglobin). - Reduce the O2 consumption of the patient by means of Mechanical Ventilation and sedoanalgesia.	The acid-base balance of the organism allows the metabolic functions to be carried out normally; however, in the presence of certain pathologies this balance is compromised and, likewise, the patient's health declines suddenly if the cause of this imbalance is not detected in time. The constant monitoring of PH, proteins, and arterial gases help assess the patient's condition, thus, determining the most appropriate treatment to correct the problem[9]. **EVALUATION** Target scores reached as follows: - PaCO2 with tendency to normalization - PaO2 remains normal - SaO2 is maintained (95%) with a FiO2 of 45%.

Arterial Blood Gases	*IK-228.5*	
PaO2	75-100 mmHg	80 mmHg
PaCO2	35-45 mmHg	46 mmHg
pH	7.35-7.45	7.42

DOMAIN 11: Safety / Protection	*CLASS 02: Physical Injury*
NURSING DIAGNOSES (NANDA) 00047: Deterioration of tissue integrity r/c mechanical factors (friction, pressure, immobilization) m/p destruction of layers of the skin (UPP in the sacrococcygeal region).	
OBJECTIVE: To improve the patient's tissue integrity after periodic mobilization in bed and the healing of wounds performed by nurses	
DOMAIN 02: Physiological Health	CLASS: L Tissue Integrity
EXPECTED RESULTS (NOC): 1101 Tissue integrity: skin and mucous membranes. DEFINITION: Structural indemnity and normal physiological functions of both skin and mucous membranes [7].	

INDICATORS	*TARGET SCORE*		*MEASURING SCALE: Deviation from 1 to 5*				
	MAINTAIN AT	INCREASE TO	1	2	3	4	5
110113 Integrity of the skin	2		Severe	Substantial	Moderate	Slight	No deviation
110102 Sensitivity	4						
110117 Scar tissue	3						
110104 Hydration	4						
110111 Perfusión tisular	4						

INTERVENTIONS (NIC) / ACTIVITIES [8]	**SCIENTIFIC FOUNDATION**
3590 Skin monitoring - Warning signs - Monitor color and temperature of the skin - Observe areas of pressure, friction, dryness, moisture 3 660 Wound care - Inspection of the wound (signs of inflammation, redness) - Irrigate with physiological saline solution - Avoid pressure in the wound area - Preventive care - Place suitable bandages	The skin is the largest organ of the body and it is the first protection barrier; it protects us from external agents, heat, cold, air, and microorganisms. It is waterproof, and also removes some of the body wastes. It reflects physical health and internal diseases with the change of coloration, texture, turgor, and appearance of abnormalities[9]. **EVALUATION** The target scores were reached as follows: - During 3 days of assessment, integrity reached a score of 3 for the improvement of tissue hygiene. - Scar tissue scored 4, thus starting the healing phase. - Hydration scored 5, thanks to irrigation with physiological saline solution. - Tissue perfusion was maintained at a score of 4 thanks to constant mobilization.

CONCLUSIONS

The case study is a useful method to analyze different clinical situations and identify strengths and weaknesses in relation to the care established by the nursing profession, in order to propose solutions and improvement strategies. The difference between case studies and conventional clinical cases is the phenomenological view, where the relevance of understanding the complexity of care in professional practice is exposed, which should be limited within the bounds of the study's objective, and in turn expanded according to the context. This way, the reflective attitude about situations of interest in the practice is promoted, positively impacting the awareness of the complexity and singularity of care, and at the same time it impacts the consequences that we can generate in the patient[3].

Additionally, the focused assessment of nursing enables the identification of the patients' needs to contribute to their care; therefore, it is both an ethical and legal responsibility that the nursing professional possesses the necessary theoretical knowledge and skills regarding the techniques used to provide complete and human care to patients according to the pathology they present.

Management of critical patients is influenced by many factors that should be considered by the nursing profession, since the late identification of health complications is negatively correlated to the health-illness process, thus causing an increase in care costs, prolonged hospitalization times, permanent after-effects, and even death.

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