**Title and Focus of Activity**: Autonomic Dysreflexia Simulation

*Examination/Evaluation/Diagnosis*

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**Course information:**

Neuromuscular Physical Therapy II**;** 4 units**;** Year 2, Spring term. This course follows courses work related to neuroanatomy, pathophysiology, motor control and motor learning and basic neurological examination. This advanced course develops skills related to evidence based examination and treatment of patients with neuromuscular movement dysfunction.

**Learning Experience Description**

Context: This activity is performed in the second half of the course. The students have received a total of 9 hours of lecture and lab time devoted to the assessment and treatment of individuals with spinal cord injury, including the topic of autonomic dysreflexia pathophysiology, signs and symptoms, prognosis and management. Students complete a written midterm examination which tests recall of facts related to autonomic dysreflexia. Students have also previously undergone a separate 15-20 minute guided laboratory session in a human simulation lab orienting them to the appropriate management of individuals with spinal cord injury, traumatic brain injury, and stroke in an acute care setting.

Purpose: The purpose of this experience is to ensure that students are able to recognize the physical signs and symptoms of autonomic dysreflexia and respond appropriately to manage this medical emergency.

Simulation Lab Instructions Provided to Students in Advance**:**

You will rotate through the experience in groups of two or three students. Prior to the experience you may choose to assign yourselves roles (i.e., lead therapist, second PT, PTA, student PT). Regardless of the role you assume, all members are expected to participate in the hands-on experience and contribute equally to the decision-making process.

The simulation experience will last no more than 20 minutes. Following the experience, your group will enter a debriefing room to answer questions about the case and your experience. These answers will be graded as one of your case study assignments and count for 2% of your final grade.

In the past, simulations have run ahead of schedule so feel free to arrive a little ahead of schedule. Please arrive at least 15 minutes ahead of your scheduled time for sign-in and to review the scenario. Bring your vital sign kit. You will be able to use the monitor in the room for vital sign readings (i.e., blood pressure, O2 saturation percentages).

Preparation:

This case will involve providing intervention for a patient with an acute neurological diagnosis that you have studied in class (TBI, SCI or Stroke). Due to time constraints you will **not** be expected to conduct a full neurological exam. Results of a PT exam will be provided to you with the case. To prepare please review class notes and the acute management sections of the O’Sullivan text for each of the above topics.

Equipment and Set up:

This simulation was originally designed to be conducted in a human simulation laboratory with a high fidelity simulation mannequin. While this equipment can enhance the experience for the student, a similar scenario can be enacted in a simulated acute care room with a faculty member providing updated vital sign cues when indicated (see “timing” information within the information tables below).

***Case Example:***

Patient: A 23-year old male who sustained a C5-C6 Spinal Cord Injury with a complete lesion after a cycling accident 3 days ago. Patient currently in ICU with a Philadelphia collar in place for immobilization. Post op day 2 post-surgical stabilization.

***Recommended Equipment:***

Philadelphia collar, Elastic Stockings, Tensor bandages, Abdominal binder, Equipment for vital signs

Foley catheter

***Initial Vital Signs:***

Heart Rate: 65 bpm

Blood Pressure: 104/62 mmHg

***How Vital Signs Change:***

Approximately 8-10 minutes into scenario:

Heart rate: 52 bpm

Respiratory Rate: 24

Blood pressure\*: increases to 130/75 and gradually progresses to 188/96

\**Note: Blood pressure values are only given if students recheck the blood pressure as the case progresses.*

See below “Sequence of Scenario Events and Related Student Expectations” for minute by minute guide to vitals changes throughout the scenario.

***Scenario Provided to Students:***

Neuro ICU – John Smith – Day 3 of hospitalization. Patient currently has a Philadelphia collar in place.

John Smith, 23 year old male, was admitted to ICU after a C5-C6 cervical fusion. He was biking on a trail with friends, hit a rock and flipped over his handlebars. He fell head first onto the ground and landed on his bicycle helmet. When his friends reached him he was unresponsive, and when he regained consciousness he could not move his limbs. He was brought by ambulance to the emergency department, and after a CT it was found that he has a C5-C6 spinal cord injury with a complete lesion.

Currently post op Day 2 fracture stabilization.

PT orders received Post op Day 1.

Initial evaluation completed by weekend PT yesterday. PT was unable to initiate treatment as the patient was off the floor for a follow-up scan all afternoon.

Initial PT Evaluation:

Motor: no movement in upper and lower extremities.

Sensation: minimal response upper extremities (shoulder area) and no response to sensation in his lower extremities.

His pupils are equal and reactive to light.

Nursing reports blood pressure and pulse have been on the lower end but stable.

Surgical site clean and dressing in place.

Pt lives at home with his parents and has a supportive family.

Pt has been lying in bed since surgery with repositioning every two hours performed by nursing.

Plan of care: Weekend PT to initiate early mobility and assess tolerance of upright posture.[[1]](#footnote-1)

Orders:

PT consult

No pulling with arms. No shoulder elevation > 90 degrees. Otherwise activity as tolerated.

Philadelphia collar at all times.

Abdominal binder and leg wraps when up.

**Case Study Questions:** (to be answered by each student group immediately following the case in a debriefing room and submitted for grading)

1. What symptoms did the patient present with at the start of today’s session?
2. How did the patient’s signs and symptoms (s/s) change during the session?
3. What is the most likely cause(s) of these s/s?
4. Are there other s/s you would look for to provide further confirmation of your diagnosis?
5. How should a PT respond in this situation?
6. Would you change anything if you were able to go back and do this scenario again?

**Debriefing / Guided Reflection:** (conducted with the entire class after all have completed the case)

1. Review learning objectives
2. Review case study questions and answers
3. Provide students an opportunity to express their feelings about the experience.
4. Discuss strategies to improve the management of future emergency situations.

**Sequence of Scenario Events and Related Student Expectations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Timing** | **Patient actions** | **Expected PT student interventions** | **Cues the simulated patient may provide to redirect students as needed:** |
| **Initial** | Patient is lying in a supine position in bed with the Philadelphia collar in place. | * Checks patient vital signs. |  |
| * Explains the purpose of today’s session. | “What are you going to do with me?” |
| * Applies abdominal binder and leg wraps and explain the indications for these devices. | “Why do I need to wear these?” |
| Patient reports pain 2/10 in the head and neck if asked. |  |  |
| **5 minutes** | Patient displays a weak cough and only effectively coughs with assistance. | Performs assisted cough with patient. | “Sometimes the nurse puts her hands on my stomach to help when I cough” |
| **7 minutes** |  | Begins to slowly incline the head of the bed while monitoring vital signs and stopping intermittently. |  |
| **8 minutes** | Patient initially tolerates incline, but after a minute begins to complain of a worsening headache. | * Assess orientation, pain and vital signs | Vital Signs: (provided by equipment or grading faculty only if reassessed)   * Bp 130/75 * HR 52 * RR 24 |
| **10 minutes** | “My head is really starting to hurt. It is just pounding!” | * Continue to monitor vital signs and symptoms * Recognizes that the patient is experiencing Autonomic Dysreflexia. * Looks for potential causes (check foley, ask about bowels, look for skin irritants) * Attempts to manage elevated blood pressure (lower legs, keep head elevated, loosen leg wraps) * Calls MD and/or call a Rapid Response | Vital Signs: (provided by equipment or grading faculty only if reassessed)   * Bp 188/96 * HR 52 * RR 24 |
| * Explains to the patient what is happening and continue to monitor until help arrives.   (Scenario ends) | “What is wrong with me” |

Time for student to complete the activity: Preparation for activity outside of/before class: Students are asked to review acute management of spinal cord injury, traumatic brain injury and stroke prior to the session; Class time completion of the activity: Approximately 45-55 minutes.

Readings/other preparatory materials:

1. Lecture notes
2. Required course text book: O’Sullivan SB, Schmitz TJ. Physical Rehabilitation, 6th ed. Philadelphia: F.A. Davis Company; 2014: 895-912.

Learning Objectives: [linked to relevant CAPTE standards]:

1. Apply knowledge of cardiovascular, pulmonary, genitourinary, integumentary, musculoskeletal, neuromuscular systems and system interactions to neuromuscular conditions commonly seen in physical therapy practice. [7C]
2. Evaluate data from the examination to make clinical judgments for patients/clients with neurologic pathology. [7D20]
3. Select appropriate responses to safely and effectively manage patient /client emergencies that most commonly occur in individuals with neuromuscular diagnoses. [7D33]

Methods of evaluation of student learning:

For this experience, students are graded only based upon their case study answers and not their performance in the simulation experience. This is done in an effort to minimize student anxiety of the case scenario and to provide students the opportunity to reflect on and learn from their errors to improve future performance. Other faculty might consider grading psychomotor performance as well, depending upon the objectives of the experience and the course.

**Grading Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **The student group …** | | | |
| **0** | **1** | **2** | **3** |
| **Initial signs and symptoms** | did not complete. | identified some signs and symptoms but missed key details (i.e. BP). | identified signs and symptoms with minor details absent. | correctly identified signs and symptoms. |
| **Change in signs and symptoms** | did not complete. | identified some signs and symptoms but missed key details (i.e. BP). | identified signs and symptoms with minor details absent. | correctly identified signs and symptoms. |
| **Cause of symptoms** | did not identify causes. | identified causes that are unlikely to cause symptoms. | identified other possible causes of symptoms. | correctly identified autonomic dysreflexia. |
| **Other signs and symptoms** | did not identify other potential signs and symptoms | identified some signs and symptoms but missed key details | identified signs and symptoms with minor details absent. | correctly identified additional signs and symptoms. |
| **Management of autonomic dysreflexia** | identified potentially dangerous management strategies. | identified some management strategies, but do not seek medical assistance. | identified correct management strategies with some non-life threatening omissions. | correctly identified appropriate steps to manage patient symptoms. |
| **Self-reflection** | provided an inaccurate self-reflection on performance. | provided a self-reflection with major omissions. | provided a self-reflection with minor omission. | provided an accurate self-reflection and necessary correction of performance. |

1. Instructors may choose to develop the assignment without a plan of care. In this case, the students may be asked to develop a course of action for the post-operative day #2 session. This approach adds an additional level of student engagement in this activity and will help the instructor further gauge student understanding of the management of patients in acute settings. [↑](#footnote-ref-1)