VASOVAGAL REACTIONS

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INTRODUCTION

Vasovagal response is a widely reported reaction to interventional pain and spine procedures in the awake patient, with an incidence ranging from 2-4% [1-5]. The pathophysiology is not well understood but is thought to encompass both procedural and patient factors, including the effect of local anesthetics or corticosteroids on sympathetic tone as well as the patient's previous experiences, and there is some suggestion that age [3], gender [3,6], or pre-existing anxiety or depression could correlate with risk of vasovagal episodes [7].

Vasovagal responses are generally categorized into three subtypes: heart rate depression (defined as symptomatic bradycardia with heart rate (HR) < 40), blood pressure depression (defined as symptomatic hypotension with systolic blood pressure (SBP) < 80), or mixed [8]. Typical symptoms include flushing, diaphoresis, dizziness or lightheadedness, nausea, bladder or bowel urgency, blurry vision, or even syncope. In most cases, vasovagal responses are self-limited and resolve on their own or with minimal intervention. Often, they necessitate aborting the procedure. In severe cases, cardiovascular collapse and seizure can occur [8].

Early recognition of a vasovagal response is crucial for effective management, which can significantly mitigate its impact. Prevention is also key, as it helps patients undergo interventional procedures more comfortably.

TYPICAL PRESENTATION

Case # 1: Young man with lumbar radiculopathy

A 24-year-old man was referred for bilateral L4 transforaminal epidural steroid injections. The patient reported significant needle phobia and anxiety about this procedure. He specifically stated that he has been worrying about this injection all week and has looked up the possible risks online. After speaking at length with the physician about the procedure and a thorough discussion of risks and benefits, the patient elected to proceed with the injection.

- The patient was brought to the procedure suite and placed in the prone position. A standard pulse oximeter was placed over his finger, with good HR and oxygen saturation (SpO2). Baseline HR was 95-98 beats per minute (bpm), and SpO2 was 97-99%.

- As the 6" 22G Quincke needle was advanced in an oblique manner towards the inferior aspect of the left L4 pedicle, the patient reported some discomfort and anxiety, but he was reassured that the procedure was going well. The physician noted excessive perspiration on the patient's back.
- During placement of the second needle on the right side, the patient reported a feeling of nausea and diaphoresis.
- The procedural nurse also observed that his pulse oximeter was no longer reading a signal, and upon checking, the nurse discovered he was clenching his fist. After helping him relax his hand, the oximeter showed an HR of 72.
- The patient remained communicative and wished to continue the procedure. However, he soon reported feeling lightheaded.
- A procedural pause was taken to assess the patient, whose HR readouts were 64, 60, 58, 56 in quick succession. His responses were sluggish, but he was continuing to talk with the staff.

Case # 2: Woman with cervical radiculopathy

A 44-year-old woman was referred to the spine clinic for a C7-T1 interlaminar epidural steroid injection. The patient stated she had been fasting since the previous evening and declined any offer of food or water before the procedure. She stated that she gets nervous with injections and medical procedures, and has fainted once during a previous spine injection. After discussion of risks/benefits, the patient elected to proceed with the injection.

- The patient was brought to the procedure suite and placed in the prone position. Initial pulse oximeter readings revealed a baseline HR of 56-60 and SpO2 of 95-98%.
- After a timeout, the procedure was initiated, and the patient tolerated both the local infiltration and advancement of the 20G Tuohy needle without difficulty.
- After proper placement of the needle was confirmed, injectate was administered, resulting in some mild patient discomfort. The procedure was completed, and the needle was removed.
- Vital signs remained near or at their baseline throughout this process.
- Upon rising from the procedure table, she reported feeling dizzy but remained responsive.
- While the pulse oximeter was being reapplied, she became unresponsive and slumped forward. She was positioned on the procedure table in the side-lying recovery position
- Vital signs were HR of 34, BP of 60/35, and SpO2 of 92%. The patient was unresponsive to her name, nail bed pressure, and sternal rub. She was noted to have facial pallor and diaphoresis around the forehead.

DIAGNOSIS

These two cases demonstrate the varied presentations of vasovagal response and highlight some commonalities and risk factors.

Case #1: The young man had a history of what was most likely a pre-syncopal vasovagal episode. Male sex, first-time procedure, and pre-existing procedural anxiety are known risk factors for experiencing a vasovagal reaction [1,7]. He experienced symptoms of nausea and diaphoresis initially. Continuous communication with the patient is essential here, and as he became more symptomatic, there was a continuing drop in heart rate and blood pressure, necessitating the procedure be aborted. After removal of the noxious stimulus, his symptoms abated, and vital signs quickly returned to normal. No other intervention was required in this case.

Case #2: The patient had an increased risk of vasovagal reaction due to a known history during a previous spine injection and was likely hypovolemic. This case highlights that there can be a latency period between the procedure and the development of the vasovagal response. Her response was more precipitous, with rapid cardiovascular collapse almost immediately following symptom onset. Cases that progress to symptomatic bradycardia coupled with an unresponsive patient necessitate initiation of Basic Life Support (BLS) or Advanced Cardiac Life Support (ACLS) protocols.

In the second case, there was a history of a prior pre-syncopal or syncopal episode. Routine use of moderate sedation is not encouraged for most interventional spine procedures [9]. However, conscious sedation may be considered to reduce the risk of recurrent vasovagal events in patients with a known history of these reactions [1]. In both cases, consideration of pre- or peri-procedure anxiolysis for future procedures would be prudent. If considering sedation, it is important to ensure that the patient remains responsive and communicative during the procedure.

EMERGENCY PROTOCOL

1. Recognize and stop the trigger immediately. If a vasovagal response is suspected, promptly stop the procedure and remove the offending stimulus, which is typically the procedure needle.
2. Initiate supportive measures. Place the patient in a supine position with passive leg elevation or Trendelenburg positioning. Leg crossing and calm reassurance may also help restore blood pressure and symptoms [10].
3. Assess the patient's clinical status. Monitor vital signs and evaluate for bradycardia, hypotension, or loss of responsiveness.
4. Assess whether the patient is stabilizing with supportive care. If the patient develops symptomatic bradycardia, hypotension, or becomes unresponsive, initiate the appropriate BLS/ACLS protocols.
5. Activate emergency response when indicated. If pharmacologic treatment (e.g., atropine) or more invasive management is required, activate the clinic's emergency response protocol and contact Emergency Medical Services (EMS) (911 or local equivalent) as appropriate.
6. Prepare for patient transfer. A stretcher should be readily available to safely transfer symptomatic patients out of the procedure suite if needed.
7. Observe during recovery. Monitor the patient in the recovery area until symptoms have resolved and vital signs have returned to baseline.
8. Provide discharge guidance. At discharge, inform the patient's family member or escort about the event and provide instructions on when to seek emergency care.
9. Conduct a team debrief. After the event, consider a brief team debrief to review the response and identify opportunities to prevent similar events in the future.

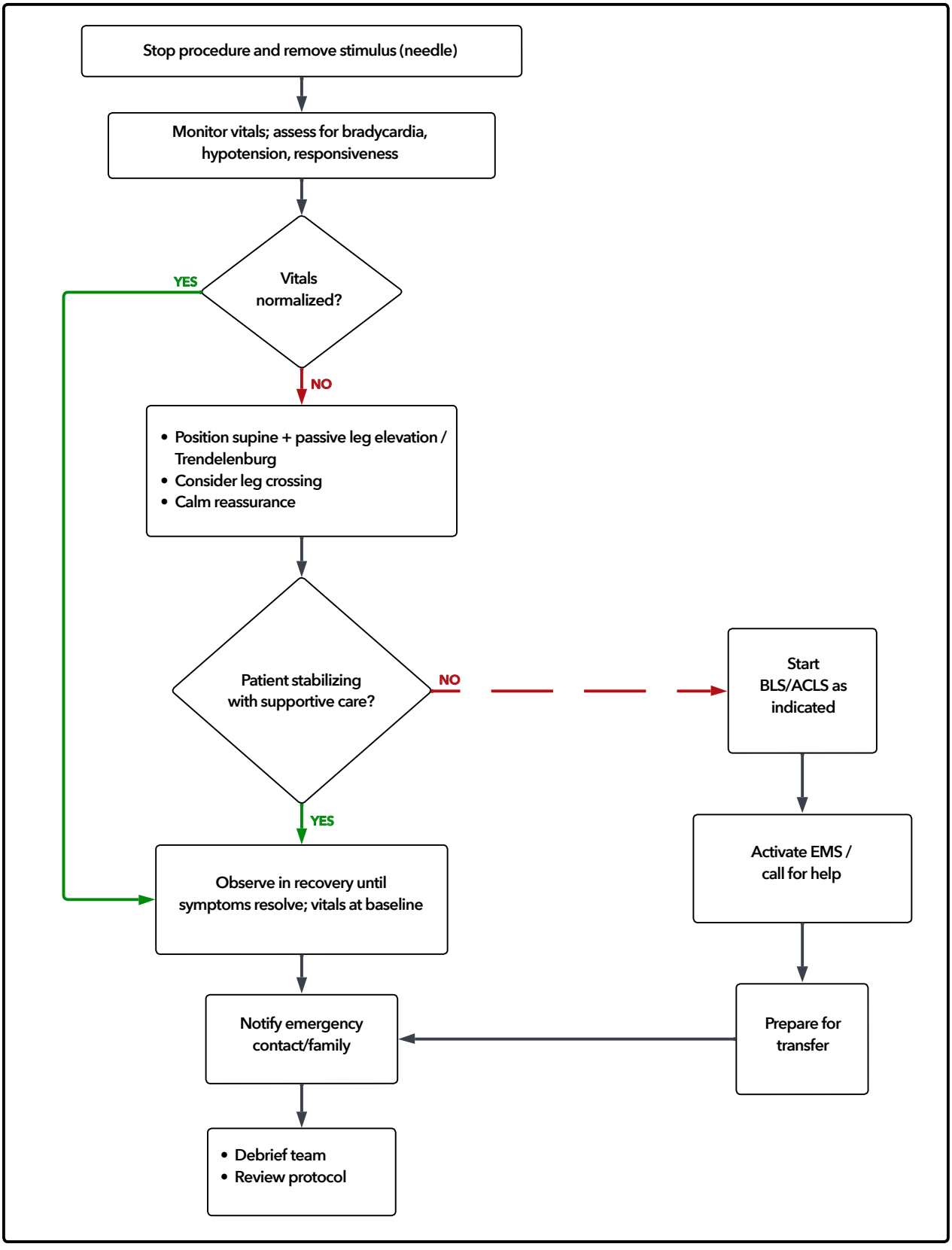
RISK MITIGATION/PREVENTION

- Identify patients at an increased risk of vasovagal reactions – those with a history of prior vasovagal reactions and previously reviewed risk factors.
  - Patients with a history of prior vasovagal reaction are 7 times more likely to experience a subsequent vasovagal reaction [1], and the use of conscious sedation for secondary prevention of a repeat event should be considered.
  - For patients with risk factors (excluding a prior vasovagal event), patient education and reassurance may be sufficient to prevent a reaction.
  - In patients who have previously experienced vasovagal reactions, the use of IV or PO anxiolytic medications may be considered as a prophylactic measure [3,11].
- Communication with the patient during the procedure is the most effective way to detect early symptoms that may indicate a vasovagal reaction. The patient's heart rate and SpO2 should be monitored, and blood pressure measurement equipment should also be readily available during the procedure.
- A staff member should be assigned to monitor vital signs during the procedure and notify the physician of changes indicative of a vasovagal response.
- Staff should be trained to monitor for changes in vital signs that herald a vasovagal response, and both the physician and staff should maintain constant communication with the patient. If provided, conscious sedation should be enough to prevent a vasovagal response while ensuring ongoing, effective bilateral communication.
- The most effective way to prevent severe vasovagal reactions with cardiovascular compromise is early detection. There should be a low threshold for the treating physician to abort the procedure once a vasovagal reaction is identified.
- Regardless of the service site, the facility should be appropriately equipped to manage emergencies (see ***Advance Preparation for Emergencies*** [12]).

KEY CONSIDERATIONS/TAKEAWAYS

- Patients with a history of prior vasovagal reactions are at increased risk of future vasovagal reactions [1]. Oral or IV anxiolysis can be effective in preventing vasovagal responses and is particularly helpful for patients with previously known vasovagal reactions.
- Continuous patient monitoring of symptoms and vital signs during the procedure is crucial for detecting a potential vasovagal event.
- If a vasovagal event occurs, there should be a low threshold for the treating physician to abort the procedure.
- Most vasovagal events can be treated supportively. If more severe symptoms arise, such as symptomatic bradycardia, these should be treated per BLS and ACLS guidelines.
- If reversal of the vasovagal response is difficult, a patient may need to be transferred to an emergency department for further treatment. Stabilization before the arrival of a rapid response team or EMS is crucial. All patients who receive ACLS-level treatment of a vasovagal event or its sequelae should be directed to an ER for further evaluation.

SUSPECTED VASOVAGAL REACTION



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DISCLAIMER

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