Postoperative Neuropathy in Gynecologic Surgery

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KEYWORDS

- Postoperative neuropathy • Nerve injury
- Postoperative complications

The development of a postoperative neuropathy is a rare complication that can be devastating to the patient. In a study of 1210 patients who underwent major pelvic surgery, the rate of postoperative neuropathy was found to be 1.9%.[1] Most cases of postoperative neuropathy are caused by improper patient positioning and the incorrect placement of surgical retractors. To fully understand the pathophysiology of postoperative neuropathy, the nerves that are at greatest risk of injury during gynecologic surgery will be presented through a series of vignettes. Suggestions for protection of each nerve will be provided.

Before embarking on a discussion of postoperative neuropathy, it is important to review a practical working classification of nerve injuries. In Seddon's classification system, there are three types of injury: neurapraxia, axonotmesis, and neurotmesis.[2] Knowing the classification system can aid in counseling patients regarding their prognosis and treatment options.

A mild injury to a nerve may cause a conduction block across a small portion of the affected nerve. This type of injury is called neurapraxia and is caused by external compression to the nerve.[3] This creates a disruption of the blood supply, which damages the nerve. This type of injury affects motor fibers more than sensory fibers. Recovery can take weeks or months and depends on how quickly the nerve fibers can remyelinate the segment that has been damaged.

A more severe injury to the nerve results in damage to the axon of the nerve, while maintaining preservation of the supporting Schwann cells. This type of injury is called axonotmesis and is caused by profound compression or traction on the nerve.[2] Both motor and sensory fibers can be affected as well as autonomic function. Even though the axon of the nerve is disrupted, regeneration is usually complete, because the supporting Schwann cells remain intact. The recovery time for axonotmesis is much longer than neurapraxia.

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The most severe injury is a complete interruption of the nerve and supporting structures. This nerve injury is called neurotmesis and is caused by transection or ligation of the nerve. Because both the nerve and supporting structures have been affected, neurotmesis has a poor prognosis for complete recovery. The necessary treatment is usually surgery to reconnect the two nerve ends.[2]

CASE 1

A 45-year-old Gravida (G) 5 Para (P) 5 (G5P5) presented with stage 3 pelvic organ prolapse. She was scheduled for a robot-assisted laparoscopic sacrocolpopexy. She was placed in dorsal lithotomy position, and shoulder braces were used to keep her from sliding on the table during steep Trendelenburg. As soon as the patient recovered from anesthesia, she complained of right hand numbness. On postoperative day number 1, a wrist drop was noted.

CASE 2

A 24-year-old G1 presented to the emergency room with abdominal pain and was found to be in hypovolemic shock. It was determined that the patient had a ruptured ectopic pregnancy, and she was taken immediately to the operating room. She underwents a laparotomy and left salpingectomy. During surgery, she was in supine position with her arms placed on arm boards. After 5 U of blood, she was stable and taken to the floor for recovery. On postoperative day number 1, she complained of pain and numbness to her left hand. On examination, there was significant weakness to the left lower arm and hand.

BRACHIAL PLEXUS INJURY

Case 1 and 2 represent two different mechanisms for developing a brachial plexus injury. The brachial plexus is made up of nerves from C5 to T1. These nerves course beneath the clavicle after branching out from the spinal cord. They then enter the arm medial to the humeral head. Usually the nerve plexus is protected by these bones. However, the structural relationship between the two can make the nerves more susceptible to stretch or compression injuries against the hard surface of the bone.

In the operating room, brachial plexus injuries can occur from several etiologies. The first is from the use of shoulder braces as seen in case 1. Often shoulder braces are used during laparoscopic surgery to prevent the patient from sliding on the operating room table (**Fig. 1**). This is a common issue when the patient is placed in steep Trendelenburg position. When shoulder braces are used, correct placement is important to prevent injury. If the shoulder brace is placed too lateral while the patient is in Trendelenburg position, a stretch injury can occur. Upward force on the shoulder by the brace is opposed by a downward gravitational force on the patient. These two opposing forces cause the brachial plexus to be stretched. General anesthesia tends to enhance this injury by creating increased joint mobility, especially when muscle relaxants are used. The shoulder brace also can cause an injury when placed too proximal to the neck. This causes a compression injury, because the brace presses the brachial plexus against the first rib.[4]

Correct placement of shoulder braces can help decrease the risk of a postoperative brachial plexus injury. The brace should be placed over the acromioclavicular joint, thereby avoiding a location that is too medial or lateral on the shoulder. Even with perfect positioning, however, a nerve injury can still occur. Finding an alternative to using the shoulder brace is a better option in reducing the risk of brachial plexus injury.

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