

# An uncommon cause of brachial plexus injury

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## ABSTRACT

نستعرض في هذا المقال حالة مصابة بشلل مؤقت للأعصاب في الجذع العلوي من الظفيرة العضدية وذلك بعد إجراء جراحة تصحيح للعمود الفقري. لقد كان السبب وراء ذلك هو الضغط الشديد الناتج عن رباط الأنبوب الرغامي، بالإضافة إلى انحناء الرأس نحو ناحية واحدة مما أدى إلى الضغط على المنطقة اليسرى فوق الترقوة وبالتالي الضغط على الجذع العلوي من الظفيرة العضدية. لقد كانت التقارير التي تطرقت إلى مثل هذه المشكلة في الأدب الطبي محدودة، والتقارير عن مثل هذه الحالة يسهل تجنبها القارئ إلى احتمال حدوث مثل هذه الإصابة حتى يمكن تجنبها مستقبلاً.

We report a case of left upper trunk neuropraxia following an uneventful case of lumbar spine fixation and fusion performed in the prone position. The cause of the injury was believed to be a very tight endotracheal tube tie in addition to the patient's head turned to one side; both caused a compression in the left supraclavicular region compressing the upper trunk of the brachial plexus. On literature review, there are limited reports of endotracheal tube tie causing upper trunk brachial plexus reported in the English literature. Attention and care needs to be exercised to avoid this largely preventable complication.

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Wrong positioning, injection injury, and incorrect use of tourniquets represents the most common causes of peripheral nerve injuries encountered in surgical practice.<sup>1-4</sup> With the expanding use of regional anesthesia, injury to the peripheral nerves and the brachial plexus

are also becoming an issue.<sup>4</sup> Postoperative brachial plexus injuries following surgeries not related to the brachial plexus are rare. One of the poorly understood is the postoperative brachial neuritis.<sup>5</sup> Postoperative brachial neuritis is characterized by arm pain followed by patchy atrophy of shoulder muscles, namely, the axillary, suprascapular, and long thoracic nerves. The prognosis is usually excellent, with 80% of patients recovering spontaneously. The superficial location of the brachial plexus makes it vulnerable to pressure injury, however, the neck is classically free from any compressive elements in most of the surgical procedures and usually not a concern. However, patients in the prone position represent a challenge to the anesthesiologists, as accidental extubation may cause severe respiratory complications, therefore securing the endotracheal tube has always been a top priority for the anesthesia team. Such a worry may force them to tie the endotracheal tube strongly and therefore cause severe pressure on the superficially located brachial plexus. Our objective in presenting this particular case is to draw attention to this possible complication, which may help prevent its occurrence in the future.

**Case Report.** Our patient is a 35-year-old right-handed woman who underwent a lumbar spine fusion and fixation for grade II spondylolisthesis. She was placed prone on a special spinal table (Jackson spinal table) with her head turned, right side up. On the first postoperative day on a routine visit, she complained of numbness over her left shoulder with inability to abduct her left shoulder and unable to flex her left elbow. Her left neck showed an indurated red streak over the area of the upper trunk of the brachial plexus (Figure 1). The diagnosis of left upper trunk palsy of the brachial plexus was made. She showed an early and complete recovery within 5 days, during which she needed a moderate degree of assistance from the nursing staff to help her in her daily activities.

**Discussion.** Kroll and associates<sup>6</sup> examined 1,541 claims filed with the American Society of Anesthesiologists,



**Figure 1** - Postoperative radiograph of the left side of the neck depicting the indurated reddish discoloration of the skin due to tightness of the endotracheal tube.

among which, 227 (15%) were for anesthesia related nerve injuries. Of the 227 claims, brachial plexus injury comprised 23% of those claims, just next to ulnar nerve injuries (34%). Anesthetic-related causes of brachial plexus injury included the use of shoulder braces, head-down position, suspension of the patient's arm on a bar, and the use of regional anesthetics. No clear explanation was given in three-quarters of the cases. The region of the neck is rarely compressed in neurosurgical procedures. Venous occlusion and obstruction of the venous return from the brain represents the most common and serious concern to the neurosurgeon operating on the brain as this may increase the intracranial pressure. Brachial plexus elements tolerate head turning well as it relaxes the plexus of the ipsilateral side and stretches the contralateral side. In the same position, the ipsilateral side becomes deeper and the contralateral side becomes

more superficial, which makes it more vulnerable to external pressure.

In conclusion, applying the tie of the endotracheal tube is one of the frequently daily used techniques, they are usually safe and well tolerated when the neck is in a neutral position, however with the neck rotated, care should be exercised to prevent compressing the superficial neurovascular structures of the neck. Given the early recovery of our patient, no electromyographic studies were ordered as a minimum of 10-21 days is required before the denervated muscle fibers begin to discharge the fibrillation potential and the motor unit potentials become polyphasic.<sup>7</sup> If the patient's weakness had lasted more than 3 weeks an electromyography would have been used.

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## ETHICAL CONSENT

All manuscripts reporting the results of experimental investigations involving human subjects should include a statement confirming that informed consent was obtained from each subject or subject's guardian, after receiving approval of the experimental protocol by a local human ethics committee, or institutional review board. When reporting experiments on animals, authors should indicate whether the institutional and national guide for the care and use of laboratory animals was followed. Research papers not involving human or animal studies should also include a statement that approval/no objection for the study protocol was obtained from the institutional review board, or research ethics committee.