Case report

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Respiratory arrest following CT guided selective cervical nerve root injection

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Introduction

CT guided cervical nerve root injection is performed for diagnostic purposes or to reduce inflammation and pain in cervical radiculopathy. Steroid and local anaesthetic are injected under CT guidance around the nerve root. This is performed as an outpatient procedure with most patients being able to be discharged 15-30 mins after the procedure. CT guidance allows the operator to see the best pathway for the needle whilst visualising structures such as the carotid and vertebral artery.

It is generally a safe procedure, with one recent study by RS Pobiel et al showing out of 802 fluoroscopy guided cervical nerve root blockades there were no major complications. (1) Some major complications are reported in the literature however, the most cited being cerebral and spinal infarction and vessel penetration. We found 2 case reports of probable subdural/intrathecal injection of local anaesthetic (LA) and steroid causing temporary paralysis of both upper and lower limbs and laboured breathing but neither causing respiratory arrest. (2,3) We present a case of temporary paralysis and respiratory arrest requiring intubation following CT guided injection of bupivacaine 0.25% and triamcinolone acetonide for nerve impingement at C7 level.

Case presentation

A 27-year-old male was diagnosed with a left sided C7 nerve root impingement with pain along with some signs of weakness and altered sensation in his arm. He had no other significant past medical history and had no allergies. He was referred for a C7 nerve root injection under CT guidance.

He presented to the radiology department just prior to the procedure as instructed. The left C6-C7 intervertebral foramina was identified. Approximately 4 ml of 1% lidocaine was injected into the skin and subcutaneous tissue at the site chosen for needle entry. A 22 gauge spinal needle was guided to the left C6-C7 intervertebral foramina region whilst performing repeated aspiration to rule out passes of the needle into the vessel or subarachnoid space. Forty mg of triamcinolone acetonide and 5 ml of bupivacaine 0.25% were injected slowly around the exiting nerve root at 8.40 am.

The patient reported nearly instant improvement in his pain. A couple of minutes following the injection however, the patient developed paraesthesia in both his upper and lower limbs followed by paralysis of both limbs and a feeling of difficulty in taking a deep breath. His breathing was noted to be becoming rapidly more laboured, and an emergency response team was called. On the arrival of the emergency team the patient was GCS 3 and was making no respiratory effort. His heart rate was 85 and he had a radial pulse. Bag mask ventilation was initiated and he was transferred to the emergency department where he was intubated using ketamine and suxamethonium at 9.05 am. He was started on a propofol and fentanyl infusion and transferred to ICU.

One hour and forty-five minutes after the injection he started to make some respiratory effort and he was extubated 3 hours 40 minutes post injection, once he had good tidal volumes and was deemed to have adequate strength back. During the whole event he remained haemodynamically stable.

Following extubation the patient reported his memory of the events. He reported that he felt his arms become tingly before struggling to be able to take a breath, but was unable to call out for help or move his arms to get attention. He then remembers not being able to take a breath at all and talked of the relief when he felt the air rush down his lungs from the mask that had been placed on his face. He remembers several of these ventilations, reporting the stress of not being able to take a breath in be-

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tween. He then lost consciousness and next remembers waking in ICU.
He remained in hospital for observation overnight and was discharged the next morning.

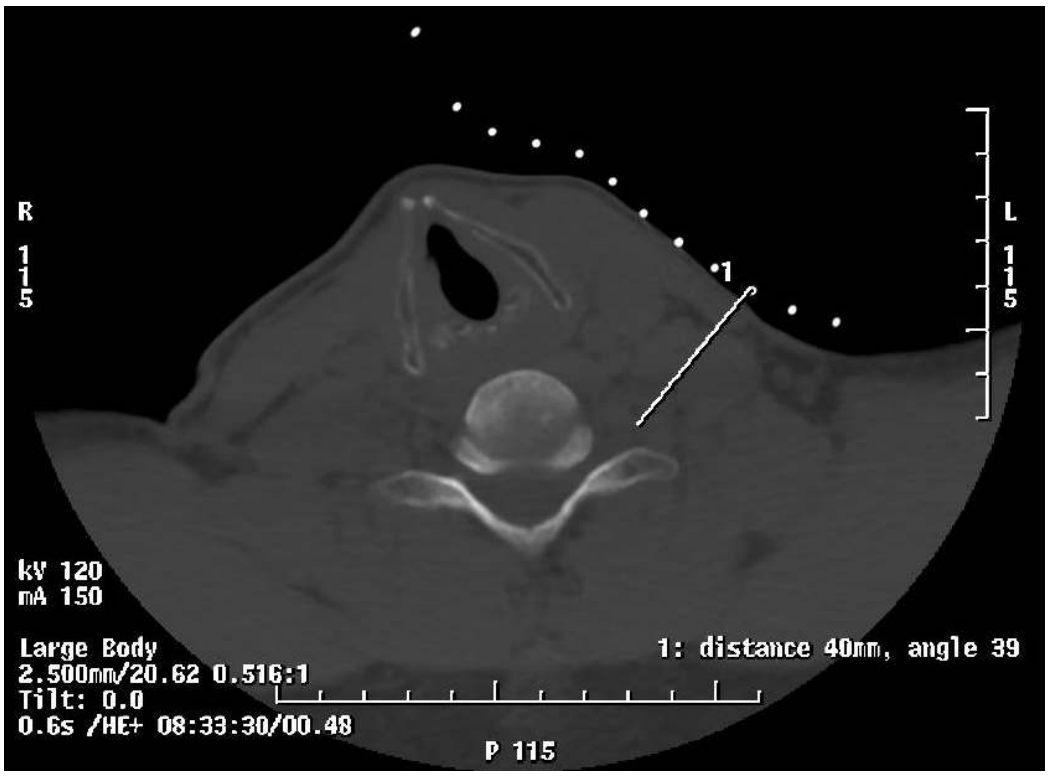
Discussion

We believe this patient most likely had a subdural/epidural injection as he did not get a large haemodynamic response that would have been expected with an intrathecal injection. This case raises several points for discussion and learning. Although epidural/intrathecal injection leading to a high paralysis during this procedure is postulated in the literature, there are very few publications of actual events with most reported major complications including spinal cord or brain infarction and death, vascular penetration with vessel injury or intravascular injection of local anaesthetic and steroid. (1,4,5) We found two published case reports of epidural/intrathecal injection, but neither causing respiratory arrest requiring intubation. (2,3,6) An internet search (Google) of patient information on this procedure, found patient information sheets from several hospitals worldwide that had no mention of this complication in their risk section. (7-10) This case therefore raises awareness of this life threatening complication.
Awareness is particularly important as these cases are being carried out in radiology departments that tend not to be staffed by people experienced in dealing with critically unwell patients or with the necessary equipment at hand. Therefore it is important that this complication is picked up early and the correct team with the correct equipment are contacted and made aware of the likely complication.
The importance of realising the potential problem is also highlighted by this case. The patient reported a very good history of awareness at the time of being paralysed, he remembers not being able to breath and being hand ventilated, being moved around and has vague memories around the time of intubation. When reviewed by intensive care staff in ED he was on little sedation secondary to being GCS 3 but was tachycardic and hypertensive. Awareness while paralysed obviously causes great psychological stress, with this particular patient reporting that they were unable to sleep the night post extubation due to concern of not waking up and flash backs to the event. Although priority is given to maintaining oxygenation in the patient, considering adequate sedation despite the patient appearing GCS 3 is vitally important and if the critical care provider is aware of the potential cause for the apparent unconsciousness this is more likely to be given early.
The safest way to carry out this procedure should also be discussed. This patient was done under CT guidance (**Figure 1**), this allows direct visualisation of the needle in relation to important structures such as the major vessels. Another technique is fluoroscopy, which shows the spread of contrast as you inject it, some authors describe this 'real time visualisation' as crucial and therefore use this technique. (1) Both of these techniques can be combined with CT guided fluoroscopy. Different approaches with the needle have also been discussed in the literature including the anteriolateral vs true lateral approach. Both the imaging technique and approach of needle are important topics that are beyond the scope of this case report.

Conclusion

Although this is regarded as a generally safe procedure, there are multiple reported cases of major complications. Epidural/intrathecal injection leading to respiratory paralysis and arrest is another one that practitioners need to think about before carrying out this procedure, and be ready to deal with these appropriately.

Figure 1. CT image during procedure



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