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Case Report

Anaesthesia Section

Anaesthetic Management for Charcot Joint Surgery in a Previously Operated Meningomyelocele Patient: A Case Report

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ABSTRACT

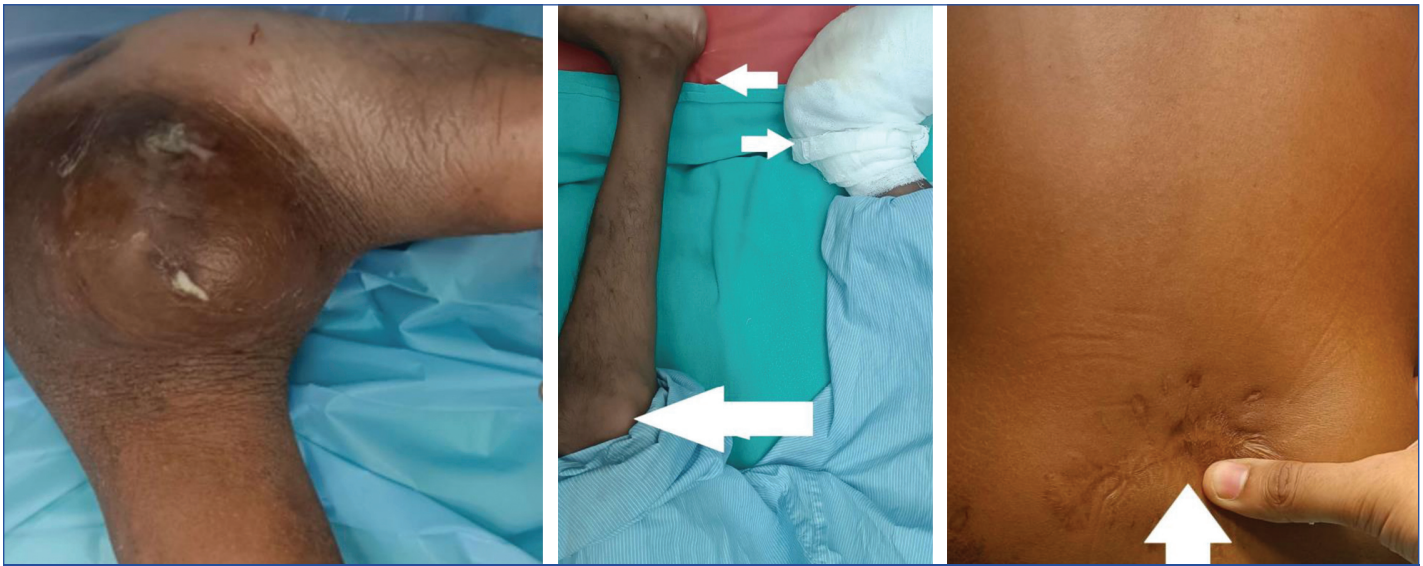
Charcot joint, a degenerative condition characterised by bone and joint destruction, often requires surgical intervention to alleviate pain and prevent complications. However, when this condition coexists with a history of meningomyelocele repair, additional considerations are necessary to ensure patient safety. The anaesthesia management for Charcot joint surgery in a meningomyelocele patient who has previously undergone surgery presents a unique challenge. Preoperative assessment should involve a comprehensive evaluation of the patient's medical history, including previous surgical procedures, neurological status, and associated co-morbidities. Given the possible problems such as scarring, adhesion, and altered anatomy that may affect the choice of anaesthetic approach and airway management, particular attention should be paid to the site of the meningomyelocele repair. Here, the authors report a case of failed spinal anaesthesia in a 20 years old male patient with a history of operating meningocele who underwent surgery for Charcot's joint. Charcot's joint is a rare complication of syringomyelia or meningomyelocele, which can cause severe neurological deficits and deformities. Surgery is often required to correct the deformity and relieve the symptoms. Spinal anaesthesia is a commonly used technique for surgeries involving the lower limbs. This abstract highlights anaesthetic management in patients with Charcot joint and a history of meningomyelocele repair.

Keywords: General anaesthesia, Joint destruction, Spinal anaethesia, Spinal cord

CASE REPORT

A 20-year-old male patient was scheduled for surgery for a Charcot joint following a neglected injury to his right ankle following a fall two years back [Table/Fig-1]. His birth history revealed a history of an operated ruptured meningomyelocele when he was six months of age. He also added that he had suffered from paraparesis in both lower limbs since childhood, but he could not recollect the exact duration. He also had right-sided Congenital Talipes Equinovarus (CTEV), for which a corrective cast was applied 14 years ago [Table/Fig-2]. There was a history of alcohol intake for one year, once or twice per week. The patient was not on any regular medications. Local examination of the spine revealed a previous scar on the back at the L3-4 space measuring 3 cm; there was no deviation in curvature [Table/Fig-3]. Local examination of the bilateral foot revealed an ulcer over the dorsum of the right foot and a hypoplastic second finger in the left foot; movement of the toe and ankle was absent. The preoperative assessment was normal. His laboratory tests are included in [Table/Fig-4].

Spinal anaesthesia was attempted at the L1-L2 level with the patient in the sitting position using a 25-gauge Quincke needle [Table/Fig-5]. However, after multiple attempts, the anaesthesia failed due to multiple adhesions. The patient complained of pain and discomfort during the procedure, and the procedure had to be halted. After the failure of spinal anaesthesia, the patient was

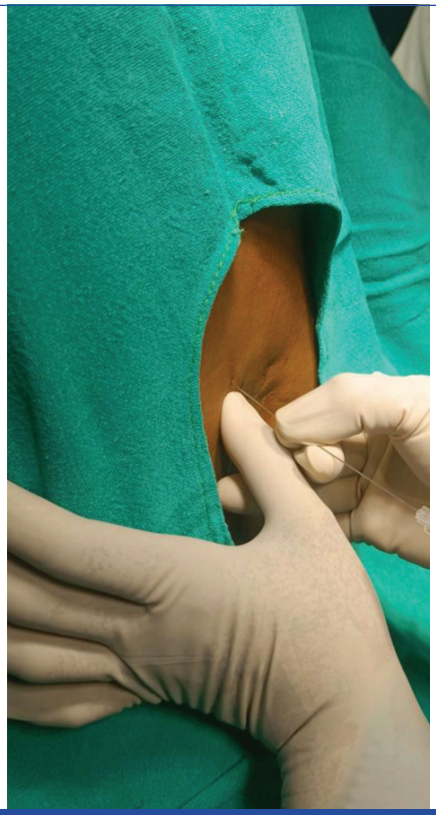


[Table/Fig-1]: Charcot joint right foot.
[Table/Fig-2]: Congenital Talipes Equinovarus (CTEV).
[Table/Fig-3]: Scar depicting H/O operated ruptured meningomyelocele on the back at L3-4 space. (Images from left to right)

Blood investigations			
Haemoglobin	11.3 gm/dL	Activated partial thromboplastin	35 sec
Total leucocyte count	7400	Pro thrombin time	12.4 sec
Platelet count	1.8 lakh	International normalised ratio	1.2
Serum creatinine	0.8 mg/dL	Random blood sugar level	112 mg/dL
Urea	22 mg/dL		
Sodium	142 mEq/L		
Potassium	4.5 mEq/l		

[Table/Fig-4]: Blood investigations.

shifted to general anaesthesia. The surgical repair of the Charcot joint was performed without any complications. The duration of the surgery was approximately two hours, and the patient remained hemodynamically stable throughout the procedure. After the procedure, the patient was shifted to the post-anaesthesia care unit, where he was observed for 24 hours. He did not experience any complications, such as headache, nausea, vomiting, or neurological deficits. The patient was discharged on the fifth post-operative day. On discharge, he was started on Tablet (Tab) Vitamin D 60k I.U. once a week for 30 days, Tab Calcium 500 mg once a day for 30 days, Tab Pantoprazole 40 mg for one week, and Tab Zerodol (100/8) for one week.



[Table/Fig-5]: Spinal anaesthesia at the L1-L2 level.

DISCUSSION

J Charcot, a French neurologist, first documented this type of fracture and dislocation of the foot bones in people with peripheral neuropathy, giving rise to the terms "Charcot arthropathy" and "Charcot's foot." Charcot neuropathic arthropathy typically results from an undiagnosed injury and affects persons with peripheral neuropathy, leading to a gradual degeneration of the bones and joints. Peripheral neuropathy causes a loss of protective sensation in the feet and frequently the hands, making it impossible for a person to feel when their feet have been injured. Although there are numerous potential causes for neuropathy, those with diabetes and heavy drinkers are the most likely to have it [1,2]. Neuropathic arthropathy must satisfy four requirements to manifest. The first is peripheral neuropathy, accompanied by a loss of protective feeling and proprioception. An unknown injury is the second condition. The damage could be brought on by trauma, such as a fall, accident, or something as simple as slamming a foot against a table leg.

Additionally, overuse or minor repetitive stress may have contributed to the injury. After the un-acknowledged first injury, the third condition continues recurrent trauma, resulting in increased harm. The fourth pre-requisite is a sufficient blood supply. Continuous trauma in a peripheral neuropathy environment can cause aberrant blood flow regulation with a marked increase in blood flow to the foot. Charcot neuropathic arthropathy is more common in individuals with severe peripheral vascular disease and insufficient blood supply to the foot [3].

Although spinal anaesthesia is a reliable and effective anaesthetic technique, it can occasionally fail unpredictably. Most anaesthesiologists believe that the rate of spinal anaesthetic failure is relatively low, but a study conducted by Jeffrey has found it to be as high as 17% [4]. Also, it may fail to provide adequate anaesthesia, especially in patients with a history of spinal cord abnormalities or surgeries [1]. Most individuals with the condition require surgery; nevertheless, there are many instances of related problems and treatment failure, including non-union infections, which can result in the need for a second procedure at rates as high as 40% [4].

The failure of spinal anaesthesia in a patient with a history of operated meningocele may be due to scar tissue or adhesions in the epidural space, which can interfere with the spread of local anaesthetic. In addition, spinal cord abnormalities, such as syringomyelia or tethered cord syndrome, can make spinal needle placement more challenging [1]. Proper counseling and consent have to be taken for the risks involved due to spinal deformities and pre-existing neurological deficits. Giving spinal anaesthesia to neonates with spinal cord disease raises serious concerns about possible postoperative neurologic damage that could be linked to the anaesthetic method. In the present case, the failure of spinal anaesthesia led to a delay in the surgery and the need for general anaesthesia. The surgical repair was performed without complications, and the patient had a satisfactory outcome. However, general anaesthesia in patients with a history of neurological disorders should be approached cautiously, as it may increase the risk of neurological complications [5].

The paramedian route is one alternative to consider when scoliosis of the spine, arthritic changes, or scar tissue make needle insertion difficult. It is necessary to consider an extra oblique plane when using the paramedian technique [6]. Patients with deformed spines from scoliosis, severe arthritis, or previous spine surgery present challenges due to anatomical and technical difficulties in establishing a successful subarachnoid block; Taylor's approach has the potential to provide excellent operating conditions with fewer side effects. For lumbar puncture in a deformed spine, Taylor's method may offer a dependable and less painful substitute for the midline approach. By inserting the spinal needle in a cephalo-medial direction, 1 cm medial and 1cm caudal to the lowermost prominence of the posterior iliac spine, this procedure is performed at the L5-S1 interspace provides unique benefits. Since it is the widest and lowest lumbar space possible, there is very little risk of spinal cord injury. Changes caused by arthritis and degeneration have the least impact on this area [7].

CONCLUSION(S)

Spinal anaesthesia is commonly used for lower limb surgeries. However, in some cases, it may fail to provide adequate anaesthesia, especially in patients with a history of spinal cord abnormalities or surgeries. Spinal anaesthesia failure can cause surgery delays and may require alternative techniques, such as general anaesthesia. Careful patient selection and close monitoring are crucial for minimising the risk of complications in patients with a history of operated meningocele undergoing surgery for Charcot joint. Therefore, the anaesthetic management of Charcot joint surgery

in a previously operated meningomyelocele patient requires a comprehensive and individualised approach.

REFERENCES

[1] Lee J, Kang H, Choi ES, Seol JW, Shin S. Spinal anaesthesia in a patient with postoperative iatrogenic pseudomeningocele - A case report . Anaesth Pain Med. 2018;13(1):107-10. Doi: 10.17085/apm.2018.13.1.107.

[2] Dixon J, Coulter J, Garrett M, Cutfield R. A retrospective audit of the characteristics and treatment outcomes in patients with diabetes-related Charcot neuropathic osteoarthropathy. N Z Med J. 2017;130(1467):62-67.

[3] Arapostathi C, Tentolouris N, Jude EB. Charcot foot associated with chronic alcohol abuse. BMJ Case Rep. 2013:2013:bcr2012008263. Doi: 10.1136/bcr-2012-008263.

[4] Levy JH, Islas JA, Ghia JN, Turnbull C. A retrospective study of the incidence and causes of failed spinal anaesthetics in a University Hospital: Anaesth Analg. 1985;64(7):705-10. Doi: 10.1213/00000539-198507000-00010.

[5] Urits I, Amgalan A, Israel J, Dugay C, Zhao A, Berger AA, et al. A comprehensive review of the treatment and management of Charcot spine. Ther Adv Musculoskelet Dis. 2020;12:01-11. Doi: 10.1177/1759720X20979497.

[6] Rabinstein AA, Keegan MT. Neurologic complications of anaesthesia: A practical approach. Neurol Clin Pract. 2013;3(4):295-304. Doi: 10.1212/CPJ.0b013e3182a1b9bd.

[7] Gupta K, Rastogi B, Gupta P, Rastogi A, Jain M, Singh V. Subarachnoid block with Taylor's approach for surgery of lower half of the body and lower limbs: A clinical teaching study. Anaesth Essays Res. 2012;6(1):38-41. Doi: 10.4103/0259-1162.103370.

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