The Role of CT Guidance in T2–T3 Sympathetic Block: Overindulgence or Essential Safety Measure?

Kanchan Godase, Nivedita Page, Kashinath Bangar, Charusheela Gaikwad
Department of Anaesthesiology and Pain Management, The Painex Clinic, Pune, Maharashtra, India

Abstract

Pain management is crucial in health care, especially in India where chronic pain affects millions of individuals. This case report discusses a rural woman with left finger gangrene unresponsive to medical management. She was planned for computed tomography (CT)- guided T2–T3 sympathetic block but was deferred due to incidental finding of pericardial effusion. Further evaluation revealed that she had systemic lupus erythematosus (SLE). She was subsequently managed with an ultrasound-guided stellate ganglion block. This case outlines the importance of thorough preprocedural evaluation and highlights the advantages of CT guidance in preventing complications and facilitating proper intervention.

Keywords: Computed tomography, Kuntz nerves, pericardial effusion, systemic lupus erythematosus

Received: 18-06-2024 **Revised: 25-07-2024** **Accepted: 13-08-2024** **Published: 19-09-2024**

Introduction

Advanced interventional modalities including fluoroscopy, ultrasonography, and computed tomography (CT) offer unique advantages for pain management.

T2–T3 sympathetic block is used for treating various vascular, sympathetic, and neuropathic conditions[1] requiring precise imaging due to the proximity of vital structures. The thoracic sympathetic ganglion lies in close proximity to vital structures. Image guidance is a must for any intervention in this region for procedural success and to prevent catastrophic complications.

Choice between CT and fluoroscopy remains a topic of debate when safety considerations are paramount.

Case Report

A 32-year-old woman presented with severe pain score 9/10 on numerical rating scale (NRS) and gangrene of the left ring finger for 6 months [Figure 1]. Color Doppler revealed reduced flow velocity in the radial artery and monophasic flow in all arteries of the left upper limb. As per our institutional protocol, CT-guided T2–T3 sympathetic block with local anesthetic was planned for procedural precision and safety.

Access this article online

Quick Response Code:

Website: https://journals.lww.com/ijpn

DOI: 10.4103/ijpn.ijpn_58_24

Basic laboratory investigations, chest X-ray, and electrocardiogram (ECG) were normal except for low amplitude of waves on ECG. A written informed consent for the procedure was obtained, and the patient was shifted for the procedure. A prior check for detailed visualization of the thoracic anatomy incidentally revealed a large pericardial effusion on CT [Figure 2]. The procedure was abandoned, and the patient was informed about the incidental findings.

Further workup showed a moderate-to-large anterior–posterior pericardial effusion with left ventricular ejection fraction (LVEF) 60% on two-dimensional echocardiography without any cardiac symptoms or hemodynamic compromise.

A detailed rheumatology workup revealed a positive antinuclear antibody status with a titer of 1:10,000, with moderate intensity of 2+ and a speckled pattern of fluorescence under the microscope, supporting a diagnosis of systemic lupus erythematosus (SLE). This also explained the peripheral gangrene as a vasculitic complication along with pericardial

Address for correspondence: Dr. Kanchan Godase,
Department of Anaesthesiology and Pain Management, The Painex Clinic,
Apte Road, Pune - 411 004, Maharashtra, India.
E-mail: drkag20@gmail.com

How to cite this article: Godase K, Page N, Bangar K, Gaikwad C. The role of CT guidance in T2–T3 sympathetic block: Overindulgence or essential safety measure? Indian J Pain 2024;38:199-201.

effusion which are the common associations of SLE. The patient was started once daily oral dose of prednisolone 5 mg, mycophenolate 500 mg, hydroxychloroquine 200 mg, and aspirin75 mg.

In view of the large pericardial effusion, the patient and her family did not consent for T2–T3 sympathectomy given the vicinity of the structure to the heart. The urgency of sympathetic block in view of impending gangrene was reiterated to them, and the option of ultrasound (US)-guided left stellate ganglion block (SGB) was explained to which they readily consented.

The US-guided left SGB was performed with 5 mL 2% lignocaine and dexamethasone 8 mg in operation theater in the presence of standby cardiologist. She developed Horner's syndrome and reduced NRS (3/10) immediately postprocedure, demonstrating the efficacy of the procedure. She was monitored for breathing difficulty, hoarseness, and other complications for 30 min following which she was discharged for domiciliary care. Follow-up was done after 1 week, 1 month, and 3 months, during which she was pain free with NRS (0/10). At 1 week of follow-up, the blackness of finger and pain had regressed [Figure 3]. Medical management was continued, and she was advised monthly follow-ups in the pain clinic.

Discussion

In SLE, digital gangrene is a rare initial manifestation.[2,3] Pericardium is one of the most commonly involved sites (prevalence 62%).[4] Our patient also had pericardial effusion; however, she did not have any symptoms and signs of decompensation leading to delayed diagnosis of her disease.

Sympathetic block of the left upper limb was urgently required in our patient as she had already started to develop signs of impending gangrene. Sympathetic ganglion cell bodies that supply upper limbs are in the T2–T8 intermediolateral horn. Preganglionic fibers ascend cephalad through white rami and synapse with postganglionic fibers, primarily T2 and T3, stellate ganglia, and middle cervical ganglia. By blocking T2–T3, which are the "key" synaptic stations, all the synaptic nerves supplying upper limbs can be blocked.[5]

In this context, SGB may not be effective in ischemic pain of the upper limb, due to the presence of Kuntz nerves through which sympathetic supply of the upper limb bypasses the stellate ganglion.[6] However, for our patient, US-guided SGB was considered because of the incidental finding of pericardial effusion.[7]

Although CT guidance for T2–T3 sympathetic block results in delivery of higher radiation dose is expensive and not easily available, it offers excellent resolution and precise needle placement, thereby increasing the safety profile. In contrast, fluoroscopic guidance provides real-time visualization, is easily available, cost-effective, and has lower radiation exposure; however, it has lower resolution which impacts accuracy and complications due to nonvisualization of vital structures. In

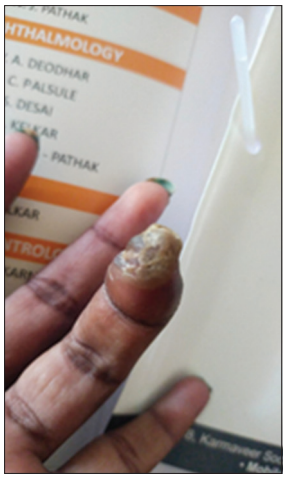

Figure 1: Preprocedure left hand ring finger gangrene with swelling and blackening of the finger

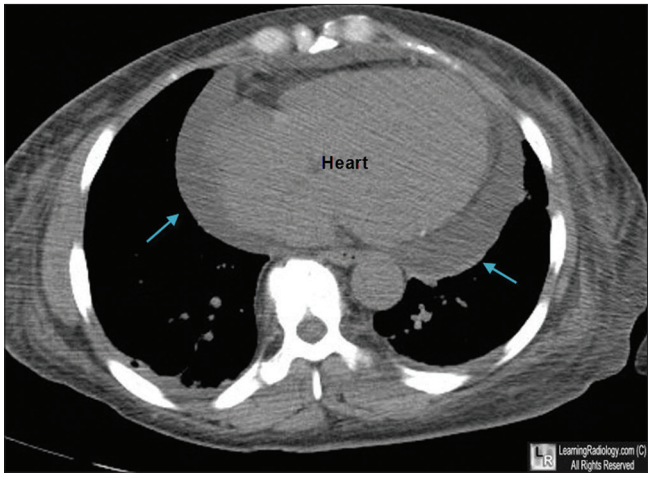

Figure 2: Reference image showing pericardial effusion on CT image. Image has been taken from learningradiology.com for the reference purpose only. As the procedure was abandoned, we do not have the patient's CT image; however, our patient's CT image closely resembled to this image

Figure 3: The patient's left hand ring finger image after 3 months of stellate ganglion block showing decreased swelling and improved blood flow

our institution, we prefer to perform T2–T3 sympathetic block under CT guidance in view of patient's safety.

After having detected the pericardial effusion, both the options of CT-guided T2–T3 sympathetic block and USG-guided SGB were explained to the patient and her relatives. However, the former option was declined by them as it entailed performing essentially an invasive procedure at the thoracic area.

This case highlights the importance of thorough evaluation and role of advanced imaging modalities like CT scan. Despite the fact that we could not perform the preferred modality of CT-guided T2–T3 sympathetic block in our patient, attempting the same itself gave us an insight into a very important finding. Although we could have proceeded with our intervention safely, we thought it to be ethical to inform the patient party of the incidental but important finding and involve them in the decision-making because of ethical and potentially legal implications. Thus, this case report underscores yet another advantage, namely detection of red flags while using CT guidance for pain interventions.

Conclusion

CT is a valuable tool in armamentarium of the pain specialist, offering enhanced safety and precision. The case underscores the necessity of comprehensive patient evaluation and judicious use of imaging modalities to mitigate potential risks and optimize procedural outcomes in patients with complex medical conditions.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Roos DB. Sympathectomy for the upper extremities anatomy, indications and technics. In: Greep JM, Lemmens HA, Roos DB, Urschel HC, editors. Pain in Shoulder and Arm: Developments in Surgery. Vol. 1. Dordrecht: Springer; 1979.
2. Alalawi ZM, Alkenany S, Almahroos F, Albloushi B. Peripheral gangrene as the initial presentation of systemic lupus erythematosus in emergency department. Cureus 2020;12:e6667.
3. Nkeck JR, Endomba FT, Ndoadoumgue AL, Kalbassou FB. Gangrene of all digits and toes attributable to systemic lupus erythematosus with negative antiphospholipid antibodies. J Clin Rheumatol 2019;25:e79-80.
4. Doherty NE, Siegel RJ. Cardiovascular manifestations of systemic lupus erythematosus. Am Heart J 1985;110:1257-65.
5. Raj PP, Erdine S. Pain-Relieving Procedures: The Illustrated Guide. 1st ed. West Sussex: Wiley-Blackwell; 2012. p. 244-9.
6. Ramsaroop L, Partab P, Singh B, Satyapal KS. Thoracic origin of a sympathetic supply to the upper limb: The 'nerve of Kuntz' revisited. J Anat 2001;199:675-82.
7. Elias M. Cervical sympathetic and stellate ganglion blocks. Pain Physician 2000;3:294-304.