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Case Report

Right subclavian artery injury along with right pleural injury-inadvertent complication of internal jugular vein catheterisation and its management

Kalyani Dnyaneshwar Aher*, Minakshi Gadahire, Ashish Kumar Lallan Prasad Yadav, Nishi Bansal

Department Of General Surgery, Lokmanya Tilak Municipal Medical College and Hospital, Sion, Mumbai, Maharashtra, India

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***Correspondence:**
Dr. Kalyani Dnyaneshwar Aher,
E-mail: k193aher@gmail.com

ABSTRACT

Internal jugular vein catheterization is a commonly performed and generally safe procedure; however, it may be associated with rare but potentially fatal complications. Common complications of internal jugular vein catheterization include arterial puncture (involving the carotid artery or subclavian artery), hematoma, pneumothorax, hemothorax, chylothorax (due to thoracic duct injury, especially with left internal jugular vein catheterization), and cardiac tamponade. This case highlights the successful management of a right hypertensive pleural effusion resulting from central venous catheter misplacement in the right pleural cavity, leading to hypovolemic shock and right subclavian artery injury-an extremely rare but serious complication of right internal jugular vein catheterization.

Keywords: Central venous catherization misplacement, Haemothorax, Hypovolumic shock, Internal jugular vein, Massive pleural effusion, Subclavian artery

INTRODUCTION

Mechanical complications during central venous catheter insertion are observed in 1.1% to 18.8% of cases.[1] Subclavian artery injury during attempted cannulation of the internal jugular vein remains an exceedingly rare complication. This report describes a case in which malposition of central venous catheter into the right pleural cavity resulted in hypertensive pleural effusion, along with hypovolemic shock caused by subclavian artery injury. In this case, the catheter traversed the subclavian artery and entered the pleural space, however, active leakage was initially masked by a tamponade effect around catheter. The diagnosis was established on digital subtraction angiography during removal of the malpositioned right internal jugular vein catheter, and the patient was successfully treated with endovascular stent graft placement.

CASE REPORT

A 40-year-old man was admitted to the emergency department with a 5-day history of right hypochondriac abdominal pain, fever, yellowish discolouration of sclera, and weakness. He was an alcoholic and a known case of alcoholic liver disease, for which he had been admitted to private hospital. He was diagnosed with a liver abscess, and a pigtail catheter was inserted. Exploratory laparatomy was advised; however, due to financial constraints, the patient was referred. On admission, the patient had a Glasgow coma scale score of 12. Vital signs revealed an oxygen saturation of 95% on room air (FiO_2 21%), heart rate of 108 bpm, blood pressure of 90/60 mmHg with (mean arterial pressure 70 mm of Hg), and temperature of 38.8°C. He had right hypochondriac abdominal tenderness without rebound tenderness. Laboratory investigation showed hemoglobin of 6.8 gm/dl, white blood cell counts

of 21,000/uL, total bilirubin of 1.4 mg/dl and direct bilirubin of 0.8 mg/dl, albumin of 1.6 g/dl, and serum lactates of 2.10 mg/dL. Abdominal ultrasound confirmed moderate hepatomegaly with altered liver echotexture, surface irregularity, and medium-volume ascites. Septic shock secondary to a liver abscess was diagnosed, and empiric antibiotic therapy was initiated with intravenous inj. Meropenem 1 gm and inj. Metro 400 mg. In the emergency department, a 20 cm three-lumen central venous catheter was inserted into the right internal jugular vein using the Seldinger technique for fluid resuscitation and vasopressor infusion. The first two attempts were unsuccessful due to resistance; however, on the third attempt, the guidewire was advanced with with some difficulty. Aspiration confirmed free backflow of blood through the three ports, and each lumen flushed easily with normal saline. The catheter was therefore presumed to be correctly positioned, and fluids, vasopressor, and antibiotic were administered through it. Despite aggressive fluid resuscitation and vasopressor support, the patient remained hypotensive and developed oliguric. Within a few hours, he developed worsening respiratory distress characterized by wheezing, dyspnea and diminished breath sounds on the right side on auscultation. His condition further deteriorated with pallor, diaphoresis, bradycardia, and progressive alteration in mental status, necessitating urgent endotracheal intubation. The bedside chest X-ray revealed a massive pleural effusion on right side (Figure 1). An intercostal drainage tube was inserted, and approximately 1 L of serosanguinous pleural fluid was drained, resulting in immediate clinical improvement. However, the patient's haemoglobin dropped to 5 gm/dl, prompting immediate transfusion of packed red blood cell (RBC). A repeat chest X-ray suggested that the catheter tip was terminating in the pleural cavity, and an immediate interventional radiological endovascular treatment was recommended following consultation with a cardiovascular intervention specialist. After stabilization, the patient was transferred to the angiography suite. The central line was removed under fluoroscopic guidance, demonstrating contrast stasis; however, no opacification of right IJV was noted during removal (Figure 2). Following catheter removal, there was an increase in hemothorax with an associated drop in blood pressure. Angiography revealed an arterial leak originating from the right subclavian artery distal to the origin of internal mammary artery (Figure 3). A 10×40 mm stent graft was deployed across the leak site (Figure 4), resulting in complete exclusion of the arterial leak with no residual contrast extravasation (Figure 5). Post stent graft deployment angiography demonstrated good contrast flow across the subclavian artery with adequate perfusion of the right upper limb. The patient was subsequently transferred to the intensive care unit. Over the course of treatment, he received a total six units of packed red blood cells, with improvement of hemoglobin to 10.3 g/dl. He was started on inj. clexane 0.6 every 12 hourly on post procedure day one for three days. The patient was extubated three days after angioplasty and was initiated on oral tab. rivaroxaban 20mg twice a day. On post-procedure day 10, a repeat chest X-ray revealed an organized hemothorax. A second intercostal drainage tube was inserted in 4th intercostal space (Figure 6). Due to non-resolving hemothorax, a respiratory medicine consultation was obtained, and intrapleural streptokinase injection (1.2 lakh IU) was instilled twice daily for 3 days through intercostal drainage tube. During this period anticoagulation was modified-tab. rivaroxaban was withheld, and the patient was maintained on intravenous heparin. The procedure was uneventful, and intercostal drainage tube removed one week after completion of streptokinase therapy. The patient was discharged two days later on Tab. Clopidogril 150 mg once daily in place of tab. rivaroxaban. Patient advised to continue the tab. clopidogril and monitor for signs of bleeding such as gum bleeding, hematuria, melena or easy bruising. The patient was clinically stable on follow up.

Figure 1: Chest radiograph suggestive of right haemothorax.

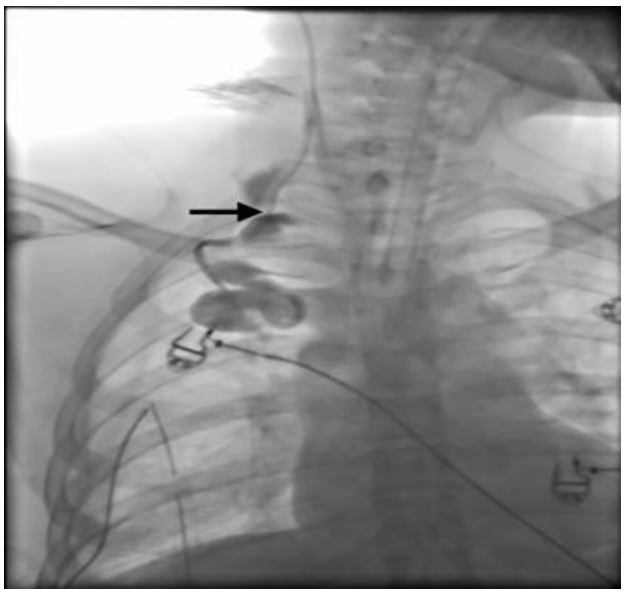

Figure 2: Fluroscopic image following contrast injection through the central venous catheter, showing absence of right internal jugular vein opacification.

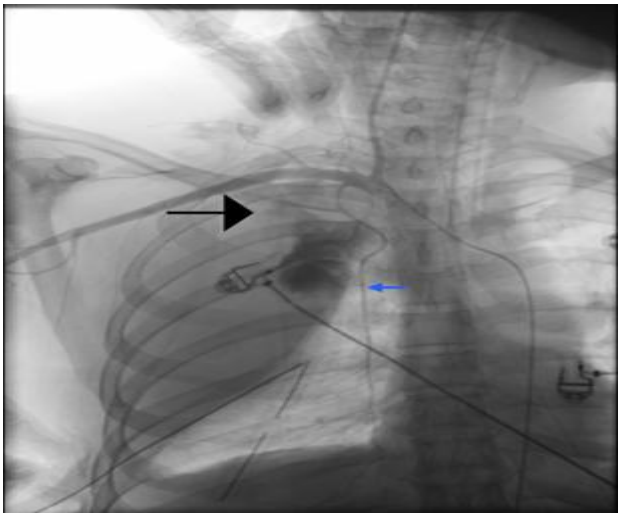

Figure 3: Digital subtraction angiography revealed an arterial leak (demonstrated with black arrow) arising from right subclavian artery, located distal to the origin of internal mammary artery (demonstrated with blue arrow).

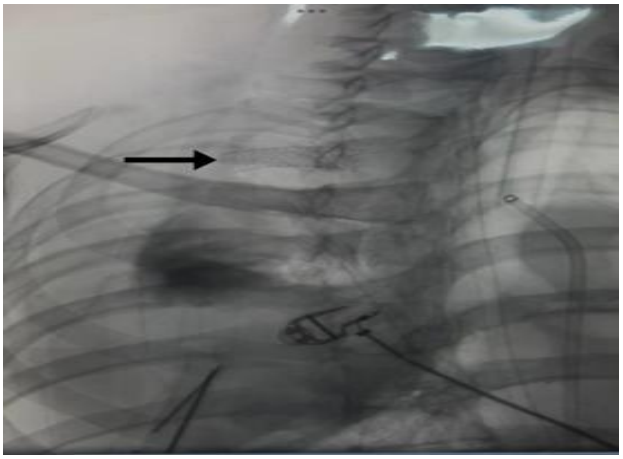

Figure 4: Digital subtraction angiography image showing (black arrow) 10×40 mm stent graft across the leak site.

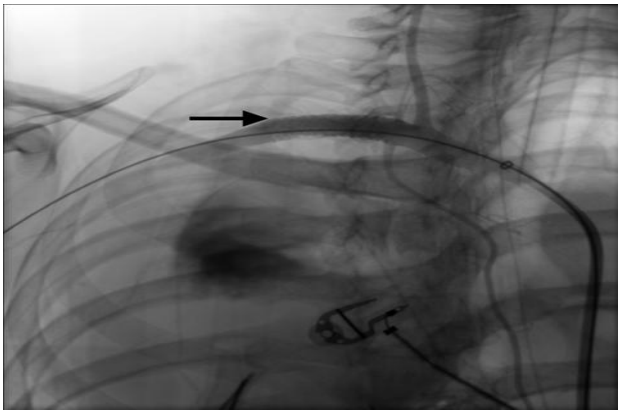

Figure 5: Post procedure angiogram demonstrating complete exclusion of the leak with no contrast extravasation.

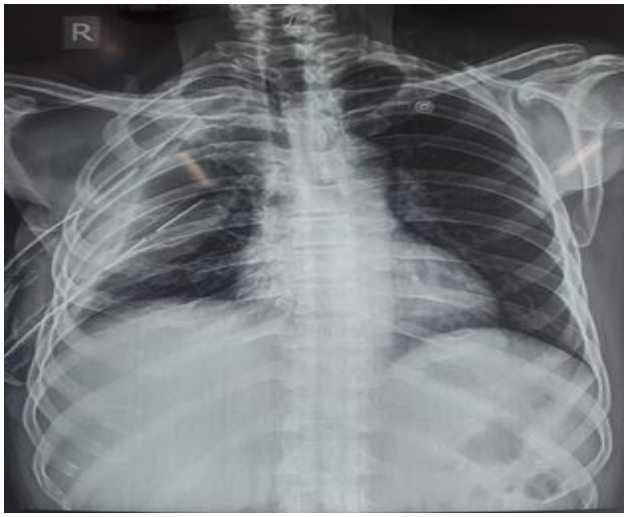

Figure 6: Chest radiograph suggestive organized hemothorax, non-resolving with 2nd intercostal drainage tube which is in 4th intercostal space.

Table 1: Laboratory tests.

Laboratory test	Findings	Normal value
Hemoglobin	6.8 gm/dl	Male:14-18 g/dl
White blood cell count	21,000/ul	4.5-11.0×109/L
Platelate count	2,57,000/L	1,50,000-4,50,000/L
Total bilirubin	1.4 mg/dl	0.1-1.2 mg/dl
Direct bilirubin	0.8 mg/dl	0.0-0.3 mg/dl
AST	40 U/L	7-55 U/L
ALT	28 U/L	8-48 U/L
Serum albumin	1.6 g/dl	3.5-5.5 g/dl
Serum lactate	2.10 mg/dl	4.5-19.8 mg/dl
Serum creatinine	1.1 mg/dl	0.6-1.2 mg/dl
Blood urea nitrogen	22 mg/dl	6-24 mg/dl

DISCUSSION

This case highlights a mechanical complication of central venous catheterization, namely extravascular cannulation, leading to hypertensive pleural effusion after piercing right subclavian artery without entering right internal jugular vein. Central venous access is essential in emergency care for fluid resuscitation, vasoactive drug administration, and hemodynamic monitoring. Ultrasound-guided right internal jugular vein (IJV) cannulation is favoured due to it's rapidity, high success rate and reduced complication profile.[2] The most frequent complication is arterial puncture occurring in 1.9-15% of cases.[3,4] The carotid artery being the most common vessel injured during internal jugular vein access. Although rare, subclavian artery injury is a serious and potentially fatal event, and may result is hemomediatinum, hemothorax or pseudoaneurysm.[3,5-7] Symptoms of hemothorax due to subclavian artery injury includes hypotension, tachycardia

or bradycardia, and decreased breath sounds on the affected side on auscultation.[8] In the present case, the hypertensive pleural effusion was likely the result of all infused fluids and vasopressors being delivered directly through the malpositioned central venous catheter. Progressive accumulation of fluid within the pleural space led to compression of the ipsilateral lung, mediastinal shift, and compromised venous return, ultimately leading to the obstructive shock from reduced preload. We suspect that subclavian artery perforation occurred during the third catheterization attempts, as evidenced by the development of hemothorax associated with shock requiring vasopressors support. This suggests that the internal jugular vein was never cannulated and that the needle was advanced deep below the clavicle, injuring both the pleura and right subclavian artery. The atypical presentation of pleural effusion without initial respiratory symptoms delayed diagnosis, with hemothorax becoming evident only on chest radiography. The aspirated blood was retrospectively recognised to be the hemorrhagic fluid from the right pleural cavity, and the hemothorax was attributed to subclavian artery injury. While pleural effusion following misplaced central venous catheter placement has been previously described, it is usually due to delayed tamponade effect on subclavian artery. Most reported cases involve delayed diagnosis secondary to unsuccessful blood aspiration or early catheter malposition.[9,10] Kulvatunyou et al explained this complication from an anatomical standpoint, noting that the right subclavian artery arises from the brachiocephalic trunk and courses beneath the internal jugular vein.[5] In the present case, the injury occurred at the distal subclavian artery. Although the guidewire was correctly advanced into the internal jugular vein, it is possible that the dilator deviated, bypassed the vessel wall and perforated the distal part of subclavian artery, and resulted in central venous catheter misplacement into the pleural cavity. subclavian arterial puncture occurs during internal jugular vein catheterization is a life-threatening complication.[5,11] The lower approach to right internal jugular vein cannulation is likely to put more arterial branches at risk like subclavian artery and its branches, including the vertebral artery and thyrocervical trunk,[12] can result in life threatening bleeding such as tension hemothorax and should be managed in a hybrid room with endovascular and surgical intervention capabilities.[12] Chest radiography, ultrasonography, or computed tomography (CT) is required for the diagnosis of hemothorax. Although CT imaging can accurately locate the source of bleeding, it may delay treatment initiation.[2] In contrast, angiography allows rapid identification of the bleeding site and facilitate immediate intervention. Covered stent placement-either balloon-expandable or self-expandable is a widely accepted, less invasive alternative to surgical repair. Balloon-expandable covered stents are generally preferred for short vascular lesions, whereas self-expandable covered stents are better suited for long or tortuous vascular lesions.[6] In certain case, surgical repair may still be considered as any appropriate treatment option. However, localization of the injured artery may be difficult and depends on the surgical approach.[7] Stent graft placement carries a risk of occlusion of the vertebral and internal mammary arteries, especially when the injury is located at the proximal subclavian artery. To reduce this risk, the stent length must be chosen with precise to ensure that nearby arterial opening are not obstructed.[8] In our patient, considering the patient's hemodynamic instability and vasopressor requirement, urgent endovascular management with stent graft placement was undertaken, foregoing CT angiography.

CONCLUSION

Central venous catheterization carries inherent risks that must be clearly explained during preoperative consent, including the possibility of life-threatening complications requiring urgent surgical intervention. Strict adherence to technical principles and supervision by an experienced surgeon throughout the procedure are essential. Prompt recognition of complication and timely intervention were key to the favourable outcome. Endovascular repair of iatrogenic subclavian artery injuries is a safe, effective, and minimally invasive option, especially in hemodynamically unstable patient.

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REFERENCES

1. Björkander M, Bentzer P, Schött U, Broman ME, Kander T. Mechanical complications of central venous catheter insertions: a retrospective multicenter study of incidence and risks. Acta Anaesthesiol Scand. 2019;63(1):61-8.
2. Tokue H, Tsushima Y, Morita H. Successful interventional management for subclavian artery injury secondary to internal jugular catheterization: a report of two cases. Cardiovasc Intervent Radiol. 2009;32(6):1268.
3. Kim J, Ahn W, Bahk JH. Hemomediastinum resulting from subclavian artery laceration during internal jugular catheterization. Anesth Analg. 2003;97(5):1257-9.
4. Sitsen ME, Ho GH, Blankensteijn JD. Deformation of self-expanding stent-grafts complicating endovascular peripheral aneurysm repair. J Endovasc Ther. 1999;6(3):288-92.
5. Kulvatunyou N, Heard SO, Bankey PE. A subclavian artery injury, secondary to internal jugular vein cannulation, is a predictable right-sided phenomenon. Anesth Analg. 2002;95(3):564-6.
6. Kusminsky RE. Complications of central venous catheterization. J Am Coll Surg. 2007;204(4):681-96.
7. Jain U, Shah K, Belusko R, Kumar P, Foy BK, Montoya A, et al. Subclavian artery laceration and acute hemothorax on attempted internal jugular vein cannulation. J Cardiothorac Vasc Anesth. 1991;5(6):608-10.

8. Melas N, Saratzis A, Saratzis N, Dimitrios K. Endovascular repair of inadvertent subclavian artery perforation during cannulation for dialysis access: case report and review of the literature. Eur J Emerg Med. 2009;16(6):323-6.
9. Nazir O, Wani MA, Jain AK, Misra R. Central venous catheter malposition into intrapleural space. J Sci Soc. 2014;41(3):197-9.
10. Paw HG. Bilateral pleural effusions: unexpected complication after left internal jugular venous catheterization for total parenteral nutrition. Br J Anaesth. 2002;89(4):647-50.
11. Chandra M, Start S, Roberts D, Bodenham A. Arterial vessels behind the right internal jugular vein with relevance to central venous catheterisation.. J Intensive Care Soc. 2015;16(3):202-7.
12. Magnone S, Gotti R, Capponi MG, Paderno N, Maraglino C, Cadei M, et al. Tension hemothorax due to iatrogenic subclavian artery perforation: Hybrid management of a very rare complication. Int J Surg Case Rep. 2019:60:323-6.

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