CASE REPORT

Case Report of a Difficult Venous Access: Retroperitoneal Approach of Inserting an Improved Non-Heparinised Port for Long-Term Use

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Summary

This is a case report of a patient with difficult venous access following thrombosis of major superficial and deep veins of the limbs as documented by ultrasound doppler and venography. The insertion of a few central ports were infected and the vein thrombosed. Venography revealed that central venous access was no longer feasible. The previous laparotomies had resulted in dense intra-peritoneal adhesions, and rendered further laparotomy virtually impossible. The patient had occasional adhesion colics, vomiting and hypoglycemic episodes. A rarely performed retro-peritoneal approach of inserting an improved non-heparinised port proved to be effective for long-term management of this patient. The surgical approach and the selected port are discussed.

Key Words: Groshong catheter, Chemoport, Retroperitoneal vascular access

Introduction

Problems of venous access are commonly seen in paediatric, renal dialysis and chemotherapy patients. Long term repeated cannulation of peripheral veins causes thrombosis of the vein and render subsequent recannulation difficult. Therefore, central venous catheter or chemoport insertion is suitable in this group of patients. The common placement of a catheter is into the superior vena cava. The rarity of the problem of insertion arises when both the subclavian veins and external iliac veins show thrombosis with multiple collaterals. With additional dense intra-peritoneal adhesion of previous laparotomies, the retroperitoneal approach was the only option left. The indication of vascular access was the adhesion colic, vomiting, and hypoglycemic episodes experienced by the patient, which warranted regular intravenous opiod and glucose infusion.

Case Report

A 35 year-old lady with repeated complaints of colicky abdominal pain, vomiting and hypoglycemia was frequently admitted to this hospital. The symptoms resolved with conservative treatment of nil per orally and intravenous fluids administration. She had multiple past surgeries, such as appendicectomy, open cholecstectomy, partial gastrectomy, colectomy and numerous adhesiolysis for intestinal obstruction. An attempt at ultrasound-guided cannulation of large veins failed. Venography showed thrombosis of the subclavian and external iliac veins with multiple collaterals. Hence, our decision was to use the retroperitoneal approach.

The anaesthetist used gaseous induction, and tiny veins found at the upper chest were successfully cannulated for temporarily intra-operative muscular relaxant and fluid administration. The location of port was pre-

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marked at right iliac crest. Hence, patient was kept in semi-left lateral position and incision made at right lumbar region. There were few small veins at subcutaneous region and deeper tissue dissection was easy. There were no adhesions at the retro-peritoneal region, but numerous collateral veins that running with the external iliac artery were encountered. One of the collateral veins that coursed with the thrombosed external iliac vein was big enough for insertion of a catheter and intra-operative X-ray imaging confirmed the catheter went into the inferior vena cava (Fig 1).

An improved non-heparinised port was selected, because of the advantage of its added catheter valve that virtually eliminates the use of heparin. It is suitable for achieving patency for long-term intravenous access. A subcutaneous cavity was created for insertion of port. The port was fixed on the deep fascia to prevent migration. The port overlying the iliac crest would help during needle insertion. The port was filled and flushed with saline without any heparin.

The use of the port was started at seventh post-operative day. The trained nurse was able to maintain aseptic technique during handling of the catheter. The patient was able to follow the instructions on the long term care of this port access. The use of this access was found to be effective and satisfactory.

Discussion

Difficult venous access can be very distressful for both patients and doctors. The conventional venous puncture with the use of torniquet can be difficult in paediatric, post-chemotherapy, renal dialysis or obese patients. During emergencies the intra-osseous route for children and intra-cavernous route for adult males have been described. However for patients with chronic diseases that require long-term repeated venous puncture, a proper venous access is pertinent.

There are a few rare reported cases of percutaneous catheter insertion into the inferior vena cava (IVC) by radiological guided puncture in infants[1]. One child had a retro-peritoneum hematoma that was treated conservtively[1]. Percutaneous catheterisation of the IVC using a translumbar or transhepatic approach requires

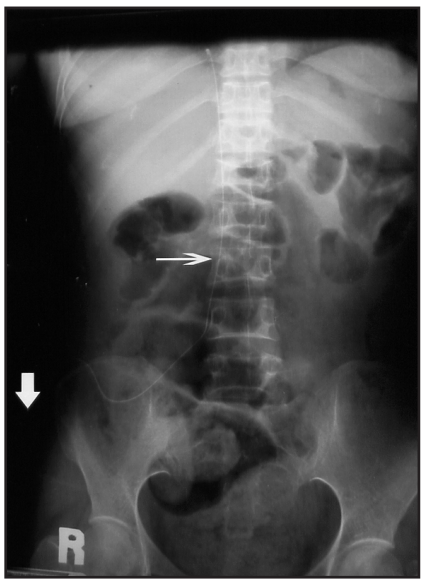

Fig 1: Abdominal X-ray showed port located at right iliac crest (thick arrow) & catheter course in inferior vena cava (thin arrow)

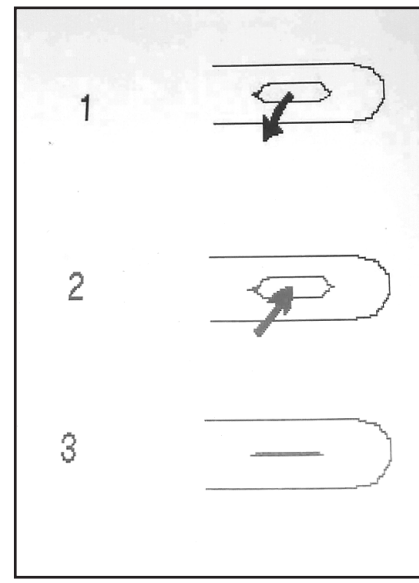

Fig 2: Diagram depicting the function of Groshong® valve at the catheter tip (1: Aspiration; 2: Infusion; 3: Fluid static at rest)

a specialised trained interventional radiologist[2]. The initial ultrasound guided assessment of our patient showed percutaneous puncture was risky, because of altered anatomy by adhesion of past lapratomies and many venous collaterals that were seen. Therefore, an open retro-peritoneum approach was decided on for this patient. Dissection under direct vision can avoid unnecessary vessel injury and excessive bleeding in the retro-peritoneal plane that is filled with many venous collaterals. This approach proved to be useful in this patient and one of the large collateral veins was cannulated with ease. The catheter was able to pass into the IVC smoothly (Fig.1). The placement of port at the iliac crest is comfortable for the patient. The bone beneath gives better counter pressure during needle insertion into the port septum.

The cheaper and commonly used Hickman catheter is not suitable for this patient. It requires daily flushing with heparin saline to prevent catheter thrombosis. Whereas, Groshong® catheter only require saline flushing after each use[3]. The selection of port with this catheter type helps our patient to avoid regular painful pricking. Furthermore, instead of heparin saline, only normal saline is needed for flushing after the port is used. This will also help the patient to better manage the port herself at home after discharge from hospital.

The common features of this new implantable port, consist of a septum for non-coring needle penetration, a bivalve rim for easy localisation of port during skin palpation, bio-compatible silicone base and suture hole for fixing the port to deep fascia of skin. The port is MRI compatible and radio-opaque which helps in X-ray visualization. The silicone material of the catheter is thrombo-resistance. The implantable port is preferred when the need for the access is intermittent because the intact skin protects the device from damage and infection, when the device is not in use[2].

Knowledge about the long term care of the implantable port is important for both health care personnel and patient. The patient should be informed about the prick sensation, which will decrease over time. The nurse or patient when using the port, needs to wash their hands and wear gloves. The alcohol swab is wiped in spiral motion over 10cm diameter of the skin, follow by 3 repeated antiseptic swabs. The port is located by using the first two fingers of the non-dominant hand and piercing the non-coring needle is perpendicular to the port septum until the bottom of reservoir. The needle position is verified by venous blood aspiration. Flushing of saline after each use to keep the catheter and ports filled with saline can prevent clot. If the port is unused for long period of time, then it requires flushing monthly. The understanding of the Groshong® valve mechanism is important (Fig. 2). During blood aspiration, the negative pressure opens the valve inward and permits aspiration. The valve opens outward during positive pressure as in flushing or infusion. The main advantage is during neutral pressure when the valve remains closed and the blood reflux and clotting cannot occur in the catheter. Therefore the need for heparin is virtually eliminated in this closed system.

In view of careful plan of the retro-peritoneal approach and appropriate selection of port, the difficulty of venous access was successfully dealt with. The new port access has proved to be effective in her for long-term management of analgesia, intravenous medication and glucose infusion during the hypoglycemic episodes.

References

1. Robertson LJ, Jaques PF, Mauro MA, et al. Percutaneous inferior vena cava placement of tunneled silastic catheters for prolonged vascular access in infants. J Ped Surg 1990; 25: 596-8.
2. Denny DF. Placement and management of long-term central venous access catheters and ports. AJR 1993; 161: 385-93.
3. Hull JE, Hunter CS, Luiken GA. The Groshong catheter: initial experience and early results of imaging-guided placement. Radiology 1992; 185: 803-7.