



ULTRASOUND-GUIDED PERCUTANEOUS INSERTION OF TUNNELLED CENTRAL VENOUS CATHETERS IN CHILDREN

Muhammad Firdaus Madzlan, Mohamad Yusof Abdullah

Paediatric Surgery Department, Women and Children Hospital, Kuala Lumpur, Malaysia

Introduction:

Central venous catheters have become a crucial aspect in children requiring long term central venous access for chemotherapy, antibiotics or frequent blood sampling (1,2). Traditionally, tunnelled central venous catheters are inserted by open surgical method; however the percutaneous technique with ultrasound-guidance have gain popularity worldwide. In our institution, the ultrasound-guided percutaneous technique has recently been practised more among surgeons. We would like to share our experience upon adopting this technique in our practise.

Methodology:

Observational, retrospective study of 6 months duration. Children who underwent ultrasound-guided percutaneous tunnelled central venous catheter insertion by paediatric surgical team Hospital Kuala Lumpur, Malaysia from June 2018 to December 2018 were recruited and followed up till 6 months post insertion.

Technique:

Sonosite Macro Maxx ultrasound machine with linear probe identify the vessels and guide cannulation. Neck punctured by introducer needle towards the internal jugular vein under ultrasound guidance. The 'J' tip guidewire passed through the needle followed by the introducer with peel-apart sheath under ultrasound supervision. Position confirmed in SVC by image intensifier. Tunneller attached with the catheter is tunnelled from the chest wall incision to neck incision. Sheath of introducer peeled apart proximally and introducer withdrawn. Catheter placed through the sheath once introducer completely withdrawn, leaving catheter within the internal jugular vein. Tip confirmed with image intensifier.

DEMOGRAPHY	
Age	
Mean ± SD (month)	94 ± 68
Weight	
Mean ± SD (kg)	25.5 ± 17.9
Gender	
Male (%)	22 (46.8)
Female (%)	25 (53.2)
Diagnosis	
Haematological malignancy (%)	22 (46.8)
Solid organ tumour (%)	23 (48.9)
Non-oncology (%)	2 (4.3)
Indication	
Chemotherapy (%)	45 (95.7)
Bone Marrow Transplant (%)	2 (4.3)
Duration	
Mean ± SD (minutes)	37 ± 16
Median	33
Device	
Externalized catheter (%)	31 (65.9)
Chemoport (%)	16 (34.1)

Complications	
Perioperatively	3
Failure to Cannulate	3
Delayed	18
<i>Mechanical</i>	5
Dislodgement	2
Dysfunction	1
Breakage	2
<i>Infectious</i>	13
Central Line Blood Stream Infection	8
Exit Site / Port pocket Infection	5
Tunnel Infection	0

Results:

Complete Data from 47 children who underwent ultrasound-guided percutaneous tunnelled central venous catheter were retrieved. Results as per table drawn. Overall complications were 44.6% with intraoperative complications of 6.4% and postoperative complications of 38.3%.

Discussion:

Our centre recorded a peri-operative complication rate of 6.4%, whereas a study in Birmingham showed a rate of 2.6% (3). Long term complication rate was 53% in open surgical method (4), however our study showed that ultrasound-guided percutaneous technique had 38.3% long term complication. Overall delayed complication rate was 31.7 % when inserted by radiological team adopting the ultrasound-guided percutaneous technique (4), whereas it was 38.3% when inserted percutaneously by our surgical team. Percutaneous technique is faster to perform. Average duration for ultrasound-guided percutaneous insertion is 37 minutes, whereas open surgical method is 50 minutes in our centre.

Conclusion:

Ultrasound-guided percutaneous insertion of tunnelled central venous catheter by paediatric surgical team is safe and efficient with low complication rates

Reference

1. Meyer JA, Werner Forssmann and catheterization of the heart, 1929. Ann Thorac Surg. 1990;49(3):497-9
2. Grundfest S, Steiger E. Experience with the Broviac Catheter for Prolonged Parenteral Alimentation. J Parenter Enter Nutr. 1979;3(2):45-7
3. Basford TJ, Poenaru D, Silva M. Comparison of delayed complications of central venous catheters placed surgically or radiologically in pediatric oncology patients. J Pediatr Surg. 2003;38(5):788-92.
4. Arul GS, Lewis N, Bromley P, Bennett J. Ultrasound-guided percutaneous insertion of Hickman lines in children. Prospective study of 500 consecutive procedures. J Pediatr Surg . 2009;44(7):1371-6.