

Comparison of External Jugular Vein with other Routes in Securing Central Venous Access

SYED ZIA HAIDER, MOHAMMAD ARSHAD, SYED HISSAM HAIDER
Department of Anesthesia, FJMC / Sir Ganga Ram Hospital, Lahore

ABSTRACT

Objective: To study the comparative safety of external jugular vein (EJV) with other routes in securing central venous access.

Patients & Methods: 50 patients presenting in operating room or intensive care unit requiring central venous access included in this study. Attempts were made to pass central venous catheter (CVC) through EJV or other routes.

Results: In 75% patients the authors were successful in passing CVC through EJV.

Conclusion: In clinically significant percentage of patients, it was possible to pass CVC through EJV. No complications were noticed using EJV as route to pass CVC.

Key Words

- External Jugular Vein
- Central Venous Access

INTRODUCTION

Intravenous access has always been a challenge and anesthetist has to accept it in a multi-disciplinary hospital setting. Days are gone when difficult intravenous access problem used to be settled ultimately by our surgical colleagues by resorting to venous cut down. There were limitations to this solution of vascular access problem, invariably by securing saphenous vein. Cut down technique had short term use as always is when peripheral veins are used. By virtue of their nature of work in operating room, anesthetists are generally thought to be adept at intravenous access. Central venous access is a land mark solution to intravenous access problem when even most experienced anesthetists are unable to cannulate a peripheral vein. As every technique has its pros and cons, same is true for central venous access technique. Internal jugular, sub-clavian and femoral veins are considered central veins as their caliber is large and they are always open to accept central venous catheters when peripheral veins are collapsed. However, these sites i.e. internal jugular, sub-clavian and femoral have their disadvantages well described in the literature (1). Major complications of central venous access through these sites are damage to the structures close by. These complications include inadvertent arterial puncture, nerve injury, potentially life threatening pneumothorax. From the knowledge of neck anatomy we know that external jugular vein drains into sub-clavian vein (2) The

EJV is a superficial structure. Central venous cannulation through EJV is a recognized technique (3). Central venous access through external jugular vein is associated with minimal complications albeit with certain failure rate (4). The use of Seldinger wire has increased the success of central venous access from 50% to 79-90% (5). The present case series aims to study success rate of central venous access through external jugular vein in comparison with other sites. Many safety measures like ultrasound guidance are not in common use as yet, so external jugular route is especially attractive because of its relative innocence.

PATIENTS & METHODS

50 patients presenting for general surgery, gynecological surgery, procedure in emergency theatre or admitted in intensive care unit and requiring central venous access was selected to include in this study. There was no bar regarding age, sex and weight. Standard contraindication like coagulopathy and local sepsis were taken into consideration. Standard central venous catheter-insertion kits containing Seldinger wire were used. In many patients 18G cannula was used for insertion of guide wire through external jugular vein. In event of difficulty in passing guide wire through external jugular vein other routes like internal jugular, sub-clavian and femoral were used. Placement of central venous catheter was confirmed by X-ray chest.

RESULTS

Out of 50 patients attempted to cannulate through EJV, 38 met success i.e. 76%. Only in 24% we were not able to pass central venous catheter through EJV (see fig.)

Statistical Analysis

In 76% among 50 patients EJV route was successfully used to achieve central venous access. In 24 % this route could not provide success to achieve central venous access. The difference in this sample is not statistically significant using SSPS version 11.

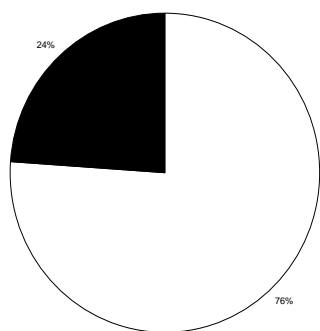


Fig. Percentage of success for different routes EJV (white) others (black)

DISCUSSION

Intravenous access is sometimes challenging for any health care provider. In the current work the authors studied the value of a very non invasive method of central venous access in some patients and compared the chances of its success with relatively more invasive and fraught with serious complications, approaches to achieve central venous access. In 76 % patients central venous access was possible through external jugular vein and in 24% patients other routes like internal jugular, femoral and sub-clavian had to be attempted. The percentage of successful attempts through EJV, although not statistically significant in this sample, it is quite significant clinically. As these procedures are required in relatively more sick and sometimes critically ill, ventilated patients the EJV route is particularly more attractive as compared to internal jugular, sub-clavian and femoral routes as serious complications, like arterial puncture, pneumothorax, hematoma are associated with more morbidity/mortality with the routes in scenario of already sick patients. EJV

route is particularly more useful when in patients with coagulopathy/thrombocytopenia the central venous access is required. Sometimes central venous line is not available due to any reasons, 18G cannula is inserted under consultants' guidance during morning hours and when CVP line is available in the evening or night, same cannula can be used to insert guide wire aseptically and CVC insertion can be accomplished by resident in evening or night hours to continue the care to the patients. Many years ago Blitt and his colleagues described central venous access through EJV using J-wire (6). A study suggested a special maneuver in difficult cases of central venous access through EJV using J-wire. They recommended that if catheter is not threaded over J-wire, the same should be with-drawn a little (0.5cm) and then attempted to pass over the guide wire. The success is attributed to difference in cross sectional area of catheter tip as compared to J-wire tip (7). In a similar study to the current one Belain showed 76% success rate using EJV to access central vein, intrathoracic location of tip catheters in 93%. No complication reported. During same study IJV catheterization was successful in 91% patients; intrathoracic location achieved in 100% patients. They concluded that IJV was reliable means of percutaneous central venous line placement but is associated with significant incidence of complications (8.). In 115 consecutive adult patients scheduled for cardio vascular surgery 150 catheterizations of superior vena cava via EJV were attempted. In 99 of the attempts J-Wire could be passed into central venous system (9)

Conclusions External jugular vein is a reliable and safe route to pass CVC in clinically significant percentage of patients.

REFERENCES

1. G. Edward Morgan, Jr, Maged S. Mikhail, Michael J. Murray. Patient Monitors: Clinical Anesthesiology, (fourth edition) 2006 McGraw Hill
2. Buithieu J, Schultz H J, Higano SH, Cahill DR. A special anatomic preparation for teaching central nervous catheterization. CLINICAL ANATOMY 1996; 9:219-226.
3. Nishihara J, Takeuchi Y, Miyake M, Nagahatas S. Distribution of morphology of valves in human external jugular vein. J Oral Maxillofacial surgery. 1996; 54: 879-882.

4. Sparks CJ, Mc Skimming I, George L. Shoulder manipulation to facilitate central vein catheterization from external jugular vein. *Anaesth Intensive Care* 1991; 19: 567-568.
5. Byth P L. Evaluation of technique of central venous catheterization via the external jugular vein using J-wire. *Anesthesia Intensive Care*. 1985;13:131-133
6. Blitt CP, Wright WA, Petty WC, Webster TA. Central venous catheterization via external jugular vein-a technique employing J-Wire. *JAMA*, 1974 Aug 12; 229(7) 817-818.
7. Alvaro M, Segura-Vasi MD, Melody D, Suelto MD, Arthur M, Boudreaux MD. External Jugular vein cannulation for central venous access. *Anaesth Analg*. March 1999 Vol 88 No. 3 692-692a.
8. Belani KG, Buckley JJ, Gordon JR, Casternada W. Percutaneous cervical central venous line placement- a comparison of the internal jugular and external jugular vein routes. *Anaesth Analg*. 1980 Jan 59 (1):40-4.
9. Berthelsen MD, B Hansen, P Howardy Hansen, J Moller. Central venous access via the external jugular vein in cardiovascular surgery. *Wiley online library*- 30 Dec 2008.