

9 COMPARISON OF ANATOMICAL LANDMARK GUIDED TWO DIFFERENT APPROACH FOR INTERNAL JUGULAR VENOUS CANULATION IN TERTIARY CARE HOSPITAL.A RETROSPECTIVE RANDOMISED STUDY.

AUTHORS-

1)DR.MANISHA S.KAPDI, Associate professor ,Anaesthesia, NHLMMC. 2)DR.DARSHNA.R.SHAH, Assistant professor, Anaesthesia, NHLMMC Ahmedabad.

3)DR.RAJENDRA M.LORIYA,2ND Year resident, Anaesthesia, NHLMMC. Ahmedabad

4)DR.DEVANSHI SHAH,1STYear resident, Anaesthesia, NHLMMC. 5)DR.BANSARI SHAH,1ST Year resident, Anaesthesia, NHLMMC.Ahmedabad

ABSTRACT:-

BACKGROUND:-

There are various approaches for internal jugular venous(IJV) canulation. Anterior approach is used commonly but it is with incidence of complications like carotid artery puncture, haematoma and pneumothorax. With posterior approach there are less incidence of above complications.

AIMS OF STUDY:-

To compare both approaches for IJV canulation in terms of procedure and complications.

MATERIALS AND METHODS:-

For both approaches 100 adult patients are randomly allocated and number of attempts, time to identify vein, duration of canulation, ease of threading, carotid artery puncture, haematoma formation are noted. Complications in form of haemothorax, pneumothorax, catheter displacement and thrombophlebitis are noted.

CONCLUSION:-

Posterior approach is better than anterior approach.

INTRODUCTION

Central venous canulation is a vital intervention in critically ill patients, patients of major elective and emergency surgeries, cardiac surgeries. Right internal jugular vein is commonly used for central venous canulation. There are various indications of IJV canulations.

-Continue haemodynamic monitoring.

- Administration of drugs likely to induce phlebitis.
- Hypotensive and hypovolemic patient to administrate vasopressors and volume expanders.
- Oedematus patients who have no peripheral vein.
- In case of extensive burns.
- For total parenteral nutrition.
- For haemodialysis.

There are various approaches for IJV canulaion. Among them anterior approach is practiced worldwide, because of easy identification of landmarks, palpation of carotid artery. Even early learners can be trained for this approach but there are limitations of this approach as there are chances of major complications like accidental carotid artery puncture, haematoma formation and chances of pneumothorax are more. Posterior approach is less practiced due to some misconcepts about approaches^{3,4,5}.

L.S.Kumar chawdhari et.al⁶ shows that access time and duration of canulation were significantly less with posterior approach than with anterior approach.

Mohan chandralekha et al⁷ also shows that there are less incidence of complications with posterior approach.

V.P.chandrasekhran et al⁸ showed by colour doppler that anatomical variations of IJV to CCA permits less chances of arterial puncture with posterior approach.

Present study was carved to compare both approaches for IJV insertion in terms of ease of insertion, time of insertion, number of attempt, ease of threading, number of complications, outcome.

MATERIAL AND METHODS:-

After approval of IRB, 100 adult patients of ASA grade I & II were enrolled randomly in the study groups.

Group I - Anterior approach – 50 patients

Group II - Posterior approach – 50 patients

Exclusion criteria:-

- SVC syndrome
- Infection at site of canulation
- Patients with Coagulopathy
- Patients with carotid disease
- Prior neck contracture
- Recent canulation of IJV

Procedure:- After proper inform consent to patient and relative, the patient is placed in supine position with 20 degree head down position⁴and basic monitor like SPO₂,ECG and NIBP are attached. Head is turned to opposite side and support (sandbag) under shoulder is put. Under sterile technique two heads of sternocledomastoid, carotid artery, external jugular vein and suprasternal notch are identified ^{1,2}.

Anterior approach:- Near apex of triangle skin wheal raised with 1 ml of lignocaine 2%. Skin puncture is done at 30 degree to skin with needle. Direction of needle towards ipsilateral nipple, with constant aspiration, needle advanced until 2 tissue pops are felt at peravertebral fascia and vein wall. Position of vein is confirmed by dark blood aspiration. Vein is cannulated by seldingers technique. Canula hub is suture with skin.

Posterior approach:- The point where EJV crosses the posterolateral border of sternocleidomastoid muscle is entry point³. Skin wheal is raised at this point with 1 ml of lignocaine 2%. The muscle is lifted and needle advanced 30 degree to skin toward suprasternal notch, rest of procedure is same as anterior approach.

Parameters observed during procedure:-

- No. of attempts to identify vein.
- Time for cannulation.(skin puncture to end of threading, recorded by stopwatch.)
- Ease of threading.
- Carotid artery puncture.
- Haematoma formation.

Parameters observed post procedure:-

- pneumothorax
- haemothorax
- catheter displacement
- thrombophlebitis

Statistical analysis:-

Statistically data expressed in mean+SD. Quantitative analysis was compared with student T-test. P value < 0.05 statistically significant and < 0.001 highly significant.

DISCUSSION

This study compares widely popular technique of anterior approach to IJV insertion with posterior approach. In posterior approach entry point of needle is higher up in the neck, so that proper length of vein for cannulation would be available and chances of complications like haemothorax, pneumothorax are avoided.

TABLE-1:-DEMOGRAPHIC DATA

Parameter	Group-I (n=50)	Group-II (n=50)	P value
Age	40.18+15.33	42.19+12.78	NS
Gender(M/F)	32/18	34/16	
BMI	23.68+3.78	24.33+3.92	NS

TABLE-2:-NO.OF ATTEMPTS

NO	Group-I (n=50)	Group-II (n=50)
1	24(48%)	42(84%)
2	16(32%)	6(12%)
3	5(10%)	2(4%)
4	5(10%)	-

TABLE-3:- RESULTS

Results	Group-I (n=50)	Group-II (n=50)	P value
Time to identify IJV (Min)	1.12+0.42	0.16+0.45	< 0.0001
Duration of canulation (Min)	3.84+0.26	2.12+0.52	< 0.0001
Ease of threading (Yes/No)	36/14	42/8	
Artery puncture	5	2	
Haematoma	2		

TABLE-4:- COMPLICATIONS

Parameters	Group-I (n=50)	Group-II (n=50)
Pneumothorax	4	-
Haemothorax	-	-
Catheter displacement	6	3
Thrombophlebitis	7	3

RESULTS

Both groups are comparable in demographics. When compared to anterior approach No. of attempts are less in posterior approach. In anterior approach group only 48% of patients are canulated in 1st attempt where as in posterior approach group 84% are canulated in 1st attempt.

Time to identify vein was quite less in posterior group 0.16 second(mean) compared to 1.12 second(mean) in anterior group.

Ease of threading was more in posterior group where as carotid artery puncture incidence was also less in posterior group.

Post procedure complications are also less in posterior group. Wisheart et al. Reported a case of injury to ascending cervical artery by posterior approach. We did not face these type of complication.

2 cases of posterior approach canulation done successfully in 1st attempt in whom we have tried 1st anterior approach which was failed as patients body mass index were borderline and who were obese.

Lamkinsi et al⁹ shown posterior approach is more efficient in procedure and less incidence of complications.

Brown et al¹⁰. reported a case of chronic haematoma after IJV canulation which require surgical removal. In our study haematoma resolved in 3 hours spontaneously after applying continue pressure, so no need of surgical intervention.

Arnold et al¹¹. described bilateral pneumothorax and subcutaneous emphysema as a complication and cook FL et al described tension pneumothorax after IJV canulation under GA but we have not encountered such complication.

CONCLUSION

In nutshell posterior approach is more beneficial than anterior approach in terms of ease of insertion, less number of attempts, ease of threading, less incidence of complications. Even it is beneficial in obese patients.

REFERENCES

- I. Willeford KL, Reitom JA. Neutral Head Position for Placement of Internal Jugular Vein Catheters. *Anaesthesia*. 1994;49:202-204.
- II. Thomas Suarez, Jefferey P. Baerwald and Chadd Kraus. Central venous access: The effects of Approach, Position and head rotation on Internal jugular vein cross sectional area. *Anesthesia*. 2002;95 (6);1519-1524.
- III. Wishear JO, Hassan MA Jackson JW. A complication of percutaneous cannulation of the internal jugular vein. *Thorax*. 1972;27:496-497.
- IV. L.S. Chudari, U.S. Karmakar, R.T. Dixit, K. Sonia et al. Comparison of two different approaches for internal jugular cannulation in surgical patients. *Journal of post graduate medicine* 1998;44 (3):57-62.
- V. Mohan Chandralekha V, Darlong V, Kashyap L et al. Internal jugular vein cannulation- Comparison of central approach and posterior approach. *European journal anesthesiology*. 2005;22;197-198.
- VI. Shanta Chandrasekharan, V.P. Chandrasekharan et al. Anatomical variations of the Internal jugular vein in relation to Common carotid artery in lesser supraclavicular fossa — A color doppler study. *International journal of basic medical science*. 2011;2 (4).
- VII. Lamkinsi et al. Internal jugular venous cannulation: What is the best approach? *Ann Fr Anesth reanim*. 2012;31 (6):512-6.
- VIII. Brown CS, Wallace CT. Chronic haematoma: a complication of percutaneous catheterization of the internal jugular vein. *Anaesthesiology*. 1986;45:368-370.
- IX. Arnold S, Feathers RS, Gibbs E. Bilateral pneumothoraces and subcutaneous emphysema: A complication of internal jugular vein puncture. *BMJ* 1978;1:211-2.