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Manual Occlusion of the Internal Jugular Vein during Subclavian Vein Catheterization: A Maneuver to Prevent Misplacement of Catheter into Internal Jugular Vein

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To the Editor:-

Recently our group published a simple method for detecting the misplacement of a subclavian vein catheter into the ipsilateral internal jugular vein (IJV). [1] This technique involved the manual compression of the ipsilateral IJV while transducing the catheter. A clear increase in pressure was noted when the catheter tip was in the IJV. We have now performed a follow-up study to see if a variation on this technique could be used to prevent entry of the subclavian vein catheters into the ipsilateral IJV.

The institute's ethics committee for human studies approved the study. Two hundred adult surgical patients scheduled for central venous cannulation *via* the subclavian approach were included. Patients with chest or neck deformities were excluded. Informed written consent was obtained from all patients. The patients were randomly assigned to one of two groups. All patients were awake, lying supine with head turned to their left. After aseptic preparation and lidocaine infiltration the right subclavian vein was located with the 22-guage hypodermic needle on a syringe, using a standard infraclavicular approach. An 18-guage introducer needle was then inserted and free flow of venous blood was confirmed. The J-tip guidewire was threaded through the introducer needle into the subclavian vein. During passage of the guidewire, the ipsilateral IJV was manually compressed in the supraclavicular area in patients belonging to the study group. In the

control group the guidewire was inserted without external compression. The IJV was compressed with the index finger of the hand holding the introducer needle while the guidewire was inserted with the other hand of the operator (fig. 1). After placement of the guidewire, the needle was withdrawn and the catheter was passed over the wire (typically 10-12 cm). During placement of the guidewire and the catheter, patients were asked if they felt giddiness, pain, or any unusual sensation in the ear or throat. Difficulty experienced by the operator during insertion was also noted. On conclusion of the procedure, a chest x-ray was performed and the position of the catheter was identified. The incidence of subclavian vein catheter misplacements and untoward effects were noted. Demographic data were analyzed using the Student *t* test.

Fig. 1

The characteristics of the patients in both groups were comparable (table 1). Ninety-eight patients in the control group and 97 patients in the study group had successful cannulation of the subclavian vein with the introducer needle. In the control group there were seven (7.14%) misplaced catheters detected with chest x-ray; six (6.12%) patients had misplacement of catheter into the ipsilateral IJV, and one (1.02%) into the contralateral subclavian vein. In the study group there were two (2.06%) misplaced catheters and both were in the contralateral subclavian vein. Difficulty was experienced during guidewire insertion with 4 patients of the control group and with 9 patients of the study group. Two patients in each group had mild pneumothoracies, which appeared on the chest x-ray. None of the study group patients complained of any untoward effects. Three patients in the control group complained of pain in the right ear and one patient experienced trickling sensations in the throat during the placement of the guidewire. No difficulties were encountered during the insertion of the catheter. Chest x-ray of these 4 patients revealed misplacement of the catheter into the ipsilateral IJV.

Table 1. Demographic Data and Incidence of Catheter Misplacements in Two Groups

	Control Group (n = 100)	Study Group (n = 100)
Age (Mean ± SD)	42 ± 13	45 ± 12*
Gender (Male:Female)	67:33	62:38*
Body mass index (Mean ± SD)	23.0 ± 2.5	22.5 ± 2.0*
Successful cannulation of SV	98	97*
Total number of catheter misplacements (%)	7 (7.14%)	2 (2.06%)
Misplacement of catheter in IJV (%)	6 (6.12%)	0 (0%)
Pain in ear or trickling throat	4	0 (0%)

* P > 0.05 = not significant.
SV = subclavian vein; IJV = internal jugular vein.

Table 1

The correct placement of the central venous catheter is essential for accurate monitoring of CVP and long-term use of the catheter. Misplacement of the tip may enhance the risk of clot formation, chemical or bacterial thrombophlebitis, and catheter erosion, in addition to impairing the CVP measurement. [2-4] The most common misplacement of the subclavian vein catheter is into the IJV. This does not vary with the side of insertion nor does it depend on whether the head is turned toward or away from the selected side. [5]

The misplacement is typically cephalad into the ipsilateral IJV, although the catheter tip may also be placed in the contralateral IJV or the brachiocephalic vein. [1-3] No reliable method is available to prevent the misplacement of the subclavian vein catheter into the IJV. The incidence of malposition of catheters reported in the literature varies from 4-6%. [1,5] In the current study the incidence of malposition in the control group of patients was 7.14% and most of the misplacements were in ipsilateral IJV (6.12%). The operator encountered difficulty passing the guidewire with 4 patients without IJV occlusion and with 9 patients with IJV occlusion. The occlusion of ipsilateral IJV in the supraclavicular area effectively prevented the cephalad insertion of the guidewire and therefore the subclavian vein catheter into the IJV.

There have been a number of reports of ear pain in patients with subclavian vein catheters misplaced into the IJV. [6-9] König and Roscoe postulated that it occurs secondary to irritation of jugular bulb or cephalad end of ipsilateral IJV, which is innervated by the vagus nerve. [8] It is yet to be explained why all patients who experienced a catheter misplacement into the IJV did not report the same sensation. Also, it is difficult to explain why ear pain or trickling throat occurred, although it is evident that the patients who complained of ear pain or trickling throat had the catheter in the IJV. Therefore, occurrence of ear pain or trickling throat during catheterization of the subclavian vein could be a sign of misplaced catheter into the IJV.

We conclude that manual occlusion of the IJV during subclavian vein catheterization successfully prevents the misplacement of the catheter into the IJV. Our maneuver is simple to perform and requires no extra equipment or expenses.

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References

1. Ambesh SP, Pandey JC, Dubey PK: Internal jugular vein occlusion test for rapid diagnosis of misplaced subclavian vein catheter into the internal jugular vein. Anesthesiology 2001; 95: 1377-79

2. Boardman P, Hughes JP: Pictorial review: Radiological evaluation and management of malfunctioning central venous catheters. Clin Radiol 1998; 53: 10-16

3. Conces DJ, Holden RW: Aberrant locations and complications in initial placement of subclavian vein catheters. Archives Surg 1984; 119: 293-5

4. Rosa UW, Foreman M, Willsie-Ediger S: Intermittent back pain after central venous catheter placement. J Parenteral Nutr 1993; 17: 91-5

5. Sanchez R, Halck S, Walther-Larsen S, Heslet L: Misplacement of subclavian venous catheters: importance of head position and choice of puncture site. Br J Anaesth 1990; 64: 632-3

6. Hwang NC: Doctor, my ear is painful. Anaesthesia 1997; 52: 187

7. Sutherland R: Doctor, my ear is painful. Anaesthesia 1997; 52: 719-20

8. König P, Roscoe S: Painful ear sign. Anaesthesia 1999; 54: 915

9. Tomlinson S, Dearlove O: Ear pain and central venous catheters. Anaesthesia 2000; 55: 196