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Letters to Editor

A simple method of electrocardiogram: Controlled central venous catheterization

The Editor,

Central venous catheter (CVC) placement is an important intervention for fluid management, long-term antibiotic therapy, parenteral nutrition, and chemotherapy. The common method of assessing the correct placement of CVC is by the use of radiographs, which is carried out post the procedure, with the possibility of more attempts if unsatisfactory. Fluoroscopy may not be feasible in all the areas where CVC cannulation has been performed. Other methods described in recent times need expensive equipment such as ultrasound or echocardiography. Although electrocardiogram (ECG) guidance for CVC positioning was suggested as early as 1949,[1] this method is not widely used. A recent studyby Von Hellerstein[2] has shown that the chance of correct placement of CVC using the ECG-controlled technique is 96% versus 76% with the conventional technique. Although, monitoring the P-wave morphology of the ECG by connecting the guide wire with the universal adapter is an established technique to position the central line at the correct depth,[3,4] only a few central line kits (B Braun) are packed with the connecting cable to the guide wire. Also the unavailability of a universal adapter (which connects the guide wire and the ECG lead) limits the usage of this technique. We describe below a simple alternate technique to overcome this situation, without any extra cost, with instruments that are available in all the wards.

Prior to cannulation, a guide wire is passed into the cannula and the point where the tip corresponds with the tip of the cannula is measured. After skin dilatation, the CVC is threaded over the guide wire and adjusted up to the measured point. The guide wire is clamped close to the proximal end of CVC (measured point). The right ECG lead is attached to the guide wire by using the available clamps as shown in the Figure 1. This helps to complete the electrical circuit from the guide wire to the ECG lead. When the ECG monitor is set for lead II, a biphasic P wave corresponding to the guide wire tip is positioned at the mid right atrium, and withdrawal of the guide wire tip to the superior vena cava-right atrial (SVC-RA) junction produces a tall P wave, which equals the R wave height. Further withdrawal of the guide wire into the SVC reduces the P wave height. These changes in P wave morphology are observed and anchored where the morphology changes from the biphasic to the tall peak pattern if an SVC-RA junction is the site one is looking for, or where the size of the P wave becomes less than R for the superior vena cava. Two clamps can be used to maintain sterility during the procedure. By this simple alternate technique, proper placement of the central line at an appropriate depth can be achieved. The newer ECG monitors have an in-built safety mechanism to prevent electrical microshock; the output of an ECG monitor's power supply is electrically isolated from the patient by placing a very high impedance between the monitor and the

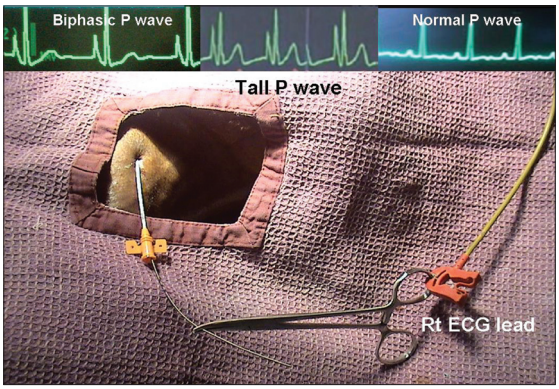

Figure 1: ECG-controlled technique with alternate method

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patient's ECG leads.[5] Before using this technique, one has to make sure that this safety feature is present in the monitor.

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