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Arterial Cannulation During Central Line Placement Creates Potential for Serious Complications

What happened?

Situation:

Subclavian central line was placed in patient's artery instead of the vein. Due to vasopressors infusing, the upper extremity became gradually more mottled and cool throughout the night. Radial pulse was detected, but faint. When it became apparent the line was in the artery, it was removed and replaced. A vascular surgeon was consulted. The extremity gradually improved with no lasting injury.

Background:

Clinicians and patients depend on central lines to deliver vital forms of therapy. Potential complications can be caused by inaccurate placement of the central catheter. If the tip of a central venous catheter (CVC) is inadvertently placed in an artery, the major complications that can result are mechanical injuries, such as perfusion and erosion by the catheter tip, and injuries caused by intra-arterial infusion of caustic medications and other solutions. Inadvertent arterial cannulations are reported in 0.2% to 1.0% of all insertions.

Documentation on arm appearance progressed from "pink and warm" to "mottled and warm" to "cold, pale, mottled, weak radial pulse with Doppler". A central venous pressure (CVP) was checked and noted to be unexpected.

What went well? Central venous pressure (CVP) monitoring was ordered after a change in condition occurred. A nurse involved in the initiation of CVP monitoring noted the waveform was more arterial in appearance and the CVP number was not as expected. It was this information that helped lead the team to deduce the line was incorrectly placed.

What went wrong?

Assessment:

Ultrasound was not used to confirm placement. The central line was inadvertently placed in the patient's artery instead of the vein. This caused perfusion issues in one of the upper extremities due to multiple continuously infusing vasopressors. Signs of perfusion related complications were not immediately identified and reported because perfusion issues existed in the other limbs which made it difficult to distinguish. The medical team was updated on the change in color and pulse difference prior to the discovery that the line was in the wrong place.

What are we doing?

Recommendation:

1. Potential nursing assessments of the arm to consider include pulse characteristics, appearance and temperature.
2. Placement of central venous catheters using ultrasound guidance and radiographic confirmation decreases risk for inadvertent placement in the vein.
3. Be aware of potential complications of central line misplacements, utilize appropriate nursing assessments, and report pertinent changes and concerns promptly to care providers.

Contact SafetyMatters@hshs.org with questions or feedback