

英文題目 A case report on carotid artery cannulation during venous hemodialysis catheter indwelling

中文題目 病例報告：執行頸靜脈血液透析雙腔導管置放術時發生動脈穿刺之結果及處置

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Case Presentation

A 58-year-old woman of end stage renal disease, hypertension, old pulmonary tuberculosis and Parkinsonism was found to have her arteriovenous fistula occluded suddenly. She visited our emergent department 2 days later and thrombectomy after one session of hemodialysis had been recommended. Routine survey at emergent room showed well-corrected anemia (Hb:11.2g/dl) without marked coagulopathy at that time (PLT: 213,000/ μ l, INR: 1.02, PTT: 29.3sec). Venous hemodialysis catheter was indwelled after localization by ultrasound, the color of blood from testing puncture needle favored venous origin and guide wire was indwelled smoothly without active bleeding. However, blood spouting was noted after complete placement of venous hemodialysis catheter. Catheter was removed immediately and we did the direct compression on puncture site for about 1 hour. Patient's vital signs were stable but there were intermittent oozing and progressive swelling of hematoma over right neck and submandibular area. Intensive care unit was thus booked and patient was transferred in case of airway compression by enlarging hematoma. Bedside duplex survey highly suggested the pseudoaneurysm formation. Angiography latter showed a pseudoaneurysm over right common carotid artery (figure 1a) and graft stenting was performed right after (figure 1b). In this event, about 5 hours between misplacement and graft stent insertion, there was a drop of hemoglobin from 11.2 g/dl to 9.7 g/dl. Fortunately, there was no obvious sequela after graft stenting and patient discharged one week later after successful thrombectomy on her occluded fistula.

Discussion

Studies on central venous catheterization (CVC) imply that patients of ESRD run a higher risk of all complications for their old age, prior puncture(s) and using larger catheter. It is very common in this population to have prior puncture on internal jugular vein. Since the rate of suboptimal initiation of dialysis is high, operators prefer this area for its lower infection rate and less central vein stenosis subsequently. However, the prior puncture(s) may easily result into the unpredicted changes of both surrounding and interior anatomy of internal jugular vein, which definitely challenges the further indwelling once indicated. Given that venous hemodialysis catheter has larger size of caliber (double lumen: 11.5-13Fr) than regular central venous catheter (single lumen: 6-7Fr), complications such as pseudoaneurysm and hematoma are speculated to be worse once arterial cannulation occurred when indwelling hemodialysis catheter. Although the incidence rate is unclear for the arterial cannulation during venous hemodialysis catheter insertion, it had been reported to be between 0.07-1% when put all kinds of CVC into analysis.

There are many tries to lower the arterial cannulation. Simulation technology with deliberate practice, Setting up standard operating procedure such as step-by-step checklists, manometry, and blood flow detector all have been introduced into procedures. Recently, ultrasound assistance insertion is recommended. However, it seems that all these steps would not be routinely applied to prevent arterial cannulation in regard to the rareness of this complication as well as cost and time consumption of the preventive procedures. In our case, we did use ultrasound to help localization in advance and follow the check list to determine the blood origin. However, arterial cannulation still happened for skipping the real time ultrasound assistance insertion.

Immediately removing the misplaced catheter is a reflex of most operators when arterial cannulation is discovered, but it might not be the best choice. Our case showed that direct compression after the removal of

misplaced catheter still caused a significant blood loss and pseudoaneurysm formation, not mention the potential risk of cerebrovascular deficiency following manual pressure. Several reports have shown that the size of caliber may be a main determinant of subsequent complications after arterial cannulation. It is not difficult to understand such a huge hole on carotid artery, once formed by displaced hemodialysis catheter, is less likely to be sealed by direct compression. Any further interventions, such as Angio-Seal vascular closure, endovascular stent-graft insertion and open surgical repair, would have to be undertaken in a more troublesome situation if the misplaced hemodialysis catheter had been removed. It could be even more stressful if the interventions cannot be performed within hours after removing the catheter, since life threatening hematoma from pseudoaneurysm might follow soon. Given the immediate removal of misplaced catheter in artery is a reflex, we strongly recommend that all hemodialysis centers should standardize their responses to arterial cannulation during indwelling neck hemcatheter: leaving the misplaced catheter in artery till further intervention.