

# **Comparison between retrograde and antegrade peripheral venous cannulation in intensive care unit patients: assessment of thrombus formation.**

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## **Abstract:**

**Background:** Antegrade cannulation of peripheral veins is the usual practice. Blood stasis between catheter and wall of the vein or at its tip in addition to catheter induced phlebitis may initiate a thrombosis. The use of retrograde ventriculo-jugular shunts against the direction of the blood flow with resultant decreased incidence of venous thrombosis encouraged us to compare retrograde versus conventional antegrade peripheral venous cannulation.

**Methods:** Monocentric, non-blinded, prospective observational cohort of forty ICU Patients received two peripheral venous catheters in upper limbs. One inserted in the direction of blood flow (antegrade cannula), the other inserted in an opposite direction to blood flow (retrograde cannula). Daily ultrasound (US) assessment of angle between the catheter and vascular wall to detect onset and progression of thrombus formation.

**Results:** The study included 40 patients, aged  $46.7 \pm 10.132$  years. The incidence of thrombus formation was 100% in both techniques. The onset time of thrombus formation between the catheter and the wall of a vein was significantly longer with the retrograde catheters than with the antegrade catheters with median time (interquartile range (IQR) [range]) 6 days (5-6.75[4-8]) with 95% confidence interval (CI) (5.58-6.42) versus 3 days (3-4[2-5]) with 95% CI (2.76-3.24) respectively with  $P$  value  $< 0.001$ . The time needed by the recently detected thrombus to reach the catheter tip determined by US with or without catheter failure was significantly longer in the retrograde catheters than in the antegrade catheter with median time (IQR[range]) 9 days (8-9[7-10]) with 95% CI (8.76-9.24) versus 4 days (4-5[3-6]) with 95% CI (3.76-4.24) respectively with  $P$  value  $< 0.001$ .

**Conclusion:** Retrograde cannulation did not decrease the incidence of thrombus formation, but significantly increase the onset time till thrombus formation and prolong the time needed by the newly formed thrombus to reach the catheter tip as compared with conventional antegrade cannulation.

**Keywords:** Antegrade, Retrograde, Venous cannulation, Thrombosis.