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AVALON CATHETERS IN PEDIATRIC PATIENTS REQUIRING ECMO: PLACEMENT AND MIGRATION ISSUES

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Tweet about it: @JoeChurch20-Fluoroscopy decreases the need for Avalon repositioning.

Purpose: The Avalon dual-lumen veno-venous catheter has several advantages, but the placement technique and management have not been adequately addressed in the pediatric population. We assessed our institutional outcomes and complications using the Avalon catheter in the pediatric population.

Methods: We retrospectively reviewed all pediatric patients who had Avalon catheters placed for respiratory failure at our institution from April 2009 to March 2016. Patients with congenital heart disease were excluded. All patients were managed using our standard ECMO protocol and cannula position was followed by daily chest x-ray and intermittent echocardiography (ECHO). Data collected included demographics, diagnosis, PRISM3 scores, ECMO run length, complications, and survival. The primary outcome was the need for catheter repositioning.

Results: Twenty-five patients were included, with mean age 8.3 ± 6.9 years and duration of ECMO support 15 ± 22 days. Overall survival was 68% (17/25) and mean PRISM predicted mortality was $16\% \pm 26\%$ (range 0.3 to 95.9). All patients had the primary diagnoses of respiratory failure, with secondary diagnoses including sepsis (24%), ARDS (44%), and pneumonia (68%). All catheter insertions were performed percutaneously using ultrasound guidance; 14 patients (56%) underwent placement with fluoroscopic guidance as well. After April 2013, due to standardization of practice, 9/9 placements used fluoroscopy and 8/9 utilized both fluoroscopy and ECHO. Overall, thirteen patients (52%) had problems with cannula malposition leading to inadequate flow, re-circulation, and pericardial effusions; 8 of these (62%) required cannula repositioning. Three of 14 (21%) cannulas placed with fluoroscopy went on to require repositioning, compared to 7/11 (64%) placed without fluoroscopy ($p=0.05$). The decrease in cannula repositioning after practice change is reflected in the U-chart of cannula repositioning per 100 days (**Figure 1**).

Conclusions: Complications are common with the Avalon catheter in the pediatric population. Safe access requires ultrasound guided percutaneous access, fluoroscopic imaging, and ECHO. Our rate of malposition dramatically decreased after adopting this practice.



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