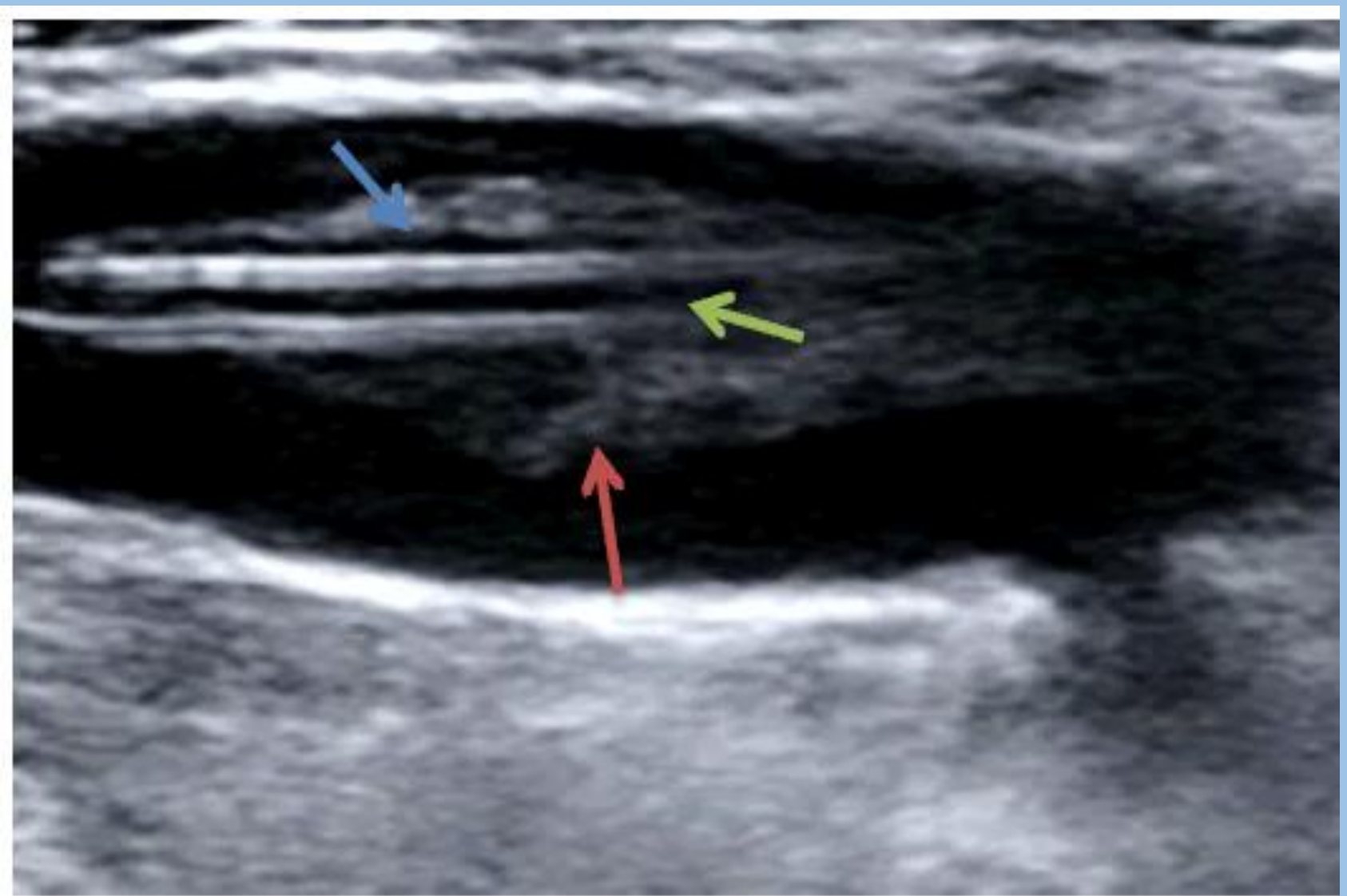


Peripherally Inserted Central Catheter (PICC) Related Central Venous Thrombosis

- a Comparative Study

INTRODUCTION

Catheter related central venous thrombosis (CRCVT) is a well-recognised complication of peripherally inserted central catheters (PICCs). The exact incidence and risk factors remain uncertain; however, some evidence suggests that Polyurethane (PU) catheters may have a higher incidence than silicone (SI) catheters. In our institution, Cambridge University Hospitals NHS Foundation Trust (CUHFT), both Silicone and Polyurethane catheters, and single 4 Fr (S/L) and dual lumen 5 Fr (D/L) PICCs, are used depending on patient requirement. In this study, we retrospectively analysed CRCVT rates to determine the incidence and to compare rates between PU and SI PICCs, and between S/L and D/L PICCs.



Subclavian Vein with CRCVT
(Long Axis View)

METHOD

All PICCs inserted into adult patients by the Vascular Access Team between January and July, 2021 were obtained from electronic hospital records (EPIC, WI, USA). These were cross referenced against hospital ultrasound reports looking for PICC related thrombosis in a central vein (axillary/subclavian, internal jugular or brachiocephalic vein). The type of PICC, number of lumens, and dwell time was recorded. The dwell time was calculated from the date of insertion (day 1) to the date of removal, date of death, or 31/8/2022 – whichever came first.

In the case of a CRCVT, the PICC dwell time before the thrombosis was determined.

The data collected were analysed to determine the thrombosis rate (percentage of lines, and thrombosis rate per 1000 catheter days) and comparisons were made between PU and SI lines (primary outcome), and between single lumen and dual lumen lines (secondary outcome) (Fisher's exact test).

Fisher exact test value:

Double Lumen vs Single Lumen PICCs – 0.2249

Polyurethane vs Silicone PICCs – 0.2028

RESULTS

2,838 PICC lines were inserted during this period (1,600 silicone [590 single, 1010 dual], 1,198 polyurethane [220 single, 978 dual]). There were 41 cases of ultrasound confirmed CRCVT (overall thrombosis rate 1.44% of catheters). 19 cases of CRCVTs were related to silicone PICCs (1.19% of silicone PICCs) and 22 to Polyurethane PICCs (1.84% of Polyurethane PICCs). There was no statistically significant difference between the thrombosis rates in silicone and polyurethane catheters ($p = 0.2$).

Eight cases of CRCVT were associated with single lumen PICCs (0.99%), and 33 cases with double lumen PICCs (1.66%). There was no statistically significant difference between the thrombosis rates in single and dual lumen catheters ($p = 0.2$).

The dwell time until diagnosis of the CRCVT ranged from 3 to 95 days, median 10.

Table 2

	Number of thromboses	Thrombosis rate (% catheters)
Single Lumen PICC	8	0.99%
Double Lumen PICC	33	1.66%
Silicone PICC	19	1.19%
Polyurethane PICC	22	1.84%

Table 1

	Number of catheters	Catheter days	Number of thromboses	Thrombosis rate (% catheters)	Thrombosis rate (per 1000 catheter days)
Single Silicone PICC	590	24589	3	0.51	0.12
Dual Silicone PICC	1010	30692	16	1.58	0.52
Single Polyurethane PICC	220	12852	5	2.27	0.32
Dual Polyurethane PICC	978	26693	17	1.74	0.64
TOTAL	2838	94827	41	1.44	0.43

CONCLUSION

Based on this retrospective audit, the CRCVT rate is consistent with reported figures – these vary between X and Y depending on the methodology used to define the CRCVT. We found no significant difference in CRCVT rates between silicone and polyurethane PICCs, or between single and dual lumen PICCs.

Future analysis would benefit from closer study of individual variables such as the patient's clinical condition, diagnosis, sex, among others.