Midline Administration of Long-term Intravenous Vancomycin

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AUTHOR PROFILES

Jona Caparas MSN, RN, CRNI, VA-BC has over 28 years of nursing experience. Twenty three of those years are in infusion therapy in various settings, as well as radiology, oncology/bone marrow transplants, orthopedics and pediatrics. She is an active member of the Infusion Nurses Society and New York State Nurses Association; President of the Association for Vascular Access New York Metro (AVANY), and Director Philippine Nurses Association-New York (PNA-NY). Jona is also a frequent lecturer on vascular access care.

Jian Ping Hu BSN, BSJ, RN has over 33 years of nursing experience. Twenty of those years were in China in various settings, including infection control, med-surg and nutrition. Her 13 years in the United States includes 9 years of IV therapy nursing and 5 years in med-surg, oncology and acupuncture.

ABSTRACT

Long term intravenous vancomycin was administered through a midline for a total of 264 catheter-days. No instances of bloodstream infection, thrombosis or phlebitis occurred. Though preliminary, vancomycin administration in the deep veins of the upper arm, for up to 25 days, appears safe when delivered via the study midline.

INTRODUCTION

In April 2014, the Vascular Access Team (VAT) at New York Hospital Queens (NYHQ) reported the results of a randomized, controlled study investigating the intravenous administration of short term (i.e., <6days) vancomycin (4mg/ml) through a novel midline device (POWERWAND®, Access Scientific, San Diego, CA). Both the PICC control group and study midline group performed equally well, with 0% thrombosis, 0% phlebitis and no statistical difference in total complications.[1]

As a result of these findings, and others attesting to the safe administration of vancomycin via peripheral access devices, Infectious Disease at NYHQ decided to eliminate pH as an absolute indication for central venous access. [2, 3, 4] Vancomycin was thereby allowed to be given in the veins of the upper arm, at a concentration of 4mg/ml—regardless of the duration of treatment. This brief report summarizes our initial experience regarding the administration of intravenous vancomycin for durations equal to or greater than six (6) days through a midline catheter.

METHODS

All patients referred to the VAT and requiring vancomycin for 6 days or more were included in the study, provided there were no contraindications to midline placement in veins of the upper arm. Patients were excluded only if there existed contraindications to midline placement or their vancomycin treatment was curtailed to less than 6 days. Lines were assessed at least daily throughout the hospitalization, and all complications were recorded. IRB approval was not required.

The method of midline catheter placement—utilizing the accelerated Seldinger technique, maximum barrier protection and chlorhexidine skin disinfectant and sponge—was identical to that which has been recorded elsewhere. (ibid 1, pg.2)

RESULTS

A total of twenty-four (24) patients—all receiving multiple medications and averaging 75.6 years old—received intravenous vancomycin for an average of 9.6 days (range 6-25 days). Total complications were 13.0% and included 2 benign infiltrations (8.3%) and 1 leakage (4.15% at the tubing catheter junction). No instances of catheter associated bloodstream infection occurred. Similarly, no patients experienced either thrombosis or phlebitis. The average midline catheter dwell time was 12 days. [Table I]

TABLE #1- Outcomes

	Age	Days on Vanco	Thrombosis	Phlebitis	Other Complications	PW Dwell Time
	67	10	0	0	0	10
	90	23	0	0	0	24
	88	15	0	0	0	23
	76	9	0	0	0	9
	97	6	0	0	0	6
	45	8	0	0	0	8
	86	7	0	0	0	7
	69	7	0	0	0	7
	59	6	0	0	0	6
	74	10	0	0	0	10
	57	8	0	0	0	8
	68	8	0	0	Gr 1 Inf.	12
	74	12	0	0	0	12
	87	6	0	0	Gr 1 Inf.	7
	63	16	0	0	0	16
	83	7	0	0	Leak	7
	84	15	0	0	0	16
	82	8	0	0	0	8
	81	11	0	0	0	26
	82	6	0	0	0	6
	64	7	0	0	0	15
	89	7	0	0	0	25
	75	8	0	0	0	8
Average	**75.65**	**9.57**	**0%**	**0%**	**13.04%**	**12.00**
Total		**220**				**276**

DISCUSSION

This observational series, which encompasses 220 days of vancomycin administration and 264 catheter-days, suggests that intravenous vancomycin can be administered through the veins of the upper arm for extended periods of time without provoking infusion thrombophlebitis. One 89 year old patient, for example, underwent 25 days of intravenous vancomycin treatment without complication—and perhaps most significantly, without a central line and the inherent complications commonly associated with central lines.[5]

The overall outcomes align with the results of our previous study. These combined results—which encompass approximately 400 vancomycin-days—indicate that safe intravenous administration of both short- and long-term vancomycin can be achieved using the study midline in the higher flow veins of the upper arm. Certainly, larger—preferably multicenter—studies on this topic are needed. In the meantime, it would seem prudent to consider the use of an upper arm midline when administering intravenous vancomycin.

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