Exploring benefits of nurse filled antibiotic elastomeric devices

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Introduction:

Elastomeric devices are well established in the delivery of medications as a controlled infusion, without the need for an electronic pump[1]. They have successfully been used to administer intravenous antibiotics to patients at home, where alternatives are not available and hospital admission would normally be required[2]. In February 2022, elastomeric devices for the delivery of piperacillin-tazobactam (Tazocin) made by nurses in patients' homes was approved for use at a South-West Teaching Trust. The practice of commercially filled elastomeric devices was well established within the Trust. However, barriers with commercially filled devices included cost and lead time. It was hoped that this service development could provide procurement cost savings and allow more timely discharge of patients or prospectively avoid hospital admission.

Methods

Data was collected for all patients enrolled in the service between February 2022 and September 2022 including indication, days of therapy, admission avoided or reduced and any adverse or troubleshooting issues. Cost savings were calculated based on cumulative cost of procurement of device, diluents, and antibiotics for nurse-filled devices vs procurement cost of pre-filled devices. Delivery costs were not included.

Results

Two community nursing teams received training in the aseptic preparation, use and troubleshooting of Vygon Accufuser® elastomeric device. Devices took between 20 and 30 minutes to make dependent on user, however no changes to nursing time slots were required in the delivery of this service. Nurse filled elastomeric devices saved more than £40,000 in procurement costs in the initial 7 months of use, when compared to equivalent commercially filled devices. Patients were discharged on intravenous antibiotics at home within 48 hours from referral, limiting factor was community nursing team capacity.

Troubleshooting and device emptying complications were rectified by device positioning education or reducing fill volume while remaining within suitable stability concentration margins. This did not lead to treatment failure in any of the patients and no drug or device wastage occurred.

Indication	Number of courses	Days of outpatient therapy	Number of admissions avoided
Bacteraemia	1	33	0
Necrotising otitis externa	4	112	0
Otitis Media	1	22	1
Respiratory infections	18	199	12
Suprapubic collection	1	126	0
Surgical site infection	2	35	0
UTI	2	12	0
Total	**29**	**539**	**13**

Table 1: A summary of the indications for treatment with piperacillin-tazobactam in a continuous infusion via elastomeric pump. Median outpatient course length 14 days, range 1-126. The indications were mostly targeted therapy for infections caused by *Pseudomonas aeruginosa.*

	Old pump (Feb - May 2022)	New pump (June 2022 onwards)
Incomplete emptying (number of patients)	6	1
Normal emptying (number of patients)	11	11
Total	**17**	**12**

Table 2: Troubleshooting and device emptying complications were significantly reduced once Vygon introduced the new pump in June 2022. One patient was switched from the old pump to the new one with no adverse or troubleshooting issues reported.

Conclusion

Nurse filled elastomeric devices have provided significant cost savings and reduced lead time for service provision with no unintended consequences. Future development will explore making elastomeric devices within the pharmacy technical services department and training additional nursing teams. This will further increase nursing team capacity and enable the service to be provided across a wider geography.

References

[1] Pryce E. Benefits of an Elastomeric Infusion Pump | Vygon UK [Internet]. Vygon. 2022 [cited 17 October 2022]. Available from: https://vygon.co.uk/benefits-of-an-elastomeric-pump/

[2] Hitchcock J, Jepson A, Main J, Wickens H. Establishment of an outpatient and home parenteral antimicrobial therapy service at a London teaching hospital: a case series. Journal of Antimicrobial Chemotherapy [Internet]. 2009 [cited 17 October 2022];64(3):630-634. Available from: shorturl.at/EW027