DRUG STABILITY

BRITISH SOCIETY FOR ANTIMICROBIAL CHEMOTHERAPY

OUTCOMES OF A NATIONAL SURVEY OF EXPERIENCE WITH CONTINUOUS INFUSION ELASTOMERIC DEVICES IN OPAT

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INTRODUCTION

- Flucloxacillin, benzylpenicillin and piperacillin-tazobactam have relatively short half-lives with dosing every 4 and 8 hours (depending on infection) to meet their PK/PD target parameters. This can limit their use in OPAT.
- Buffered continuous infusions delivered via ambulatory elastomeric devices have enabled OPAT services to treat a broader range of infections, improve home-visit utilisation and support antimicrobial stewardship through providing narrow-spectrum alternatives.
- Elastomeric devices are disposable and designed to administer the total daily dose over a 24-hour period then be replaced with a new, full device.
- There are anecdotal reports of devices, not fully emptying after 24 hours.
- Here we report the results of a national survey to help establish the extent of this problem, attributed causes and solutions employed.

METHODS

- An on-line survey was developed and circulated to the UK Clinical Pharmacy Association-Pharmacy Infection Network and the BSAC OPAT contact list in October 2018.
- The survey comprised eight questions and ascertained how many elastomeric devices were used within each Trust on average per month, requested information about the frequency of residual volume remaining in devices, invited thoughts about the cause of the incomplete infusion, how device flow problems had been rectified and if the incomplete infusion was considered clinically significant.
- As anecdotal observations had been noted with flucloxacillin and piperacillin-tazobactam, questions were designed with these two agents in mind.

RESULTS

- 39 individual responses were obtained. Table 1 presents the experience of each drug/device combination.
- Piperacillin-tazobactam appeared to be most frequently associated with a residual volume after 24 hours in use (Fig.1).
- Residual volume remaining were most commonly attributed to the line (54%) or incorrect use of the device (33%) (Table 2).
- The most common remedial action was staff or patient education (58%).
- Overall, 17% of respondents who reported seeing residual volumes at changeover considered the reduced amount infused to be clinically significant, 17% indicated this at least some of the time, while 33% reported it clinically insignificant. 33% of respondents were unsure or the issue was still under review.

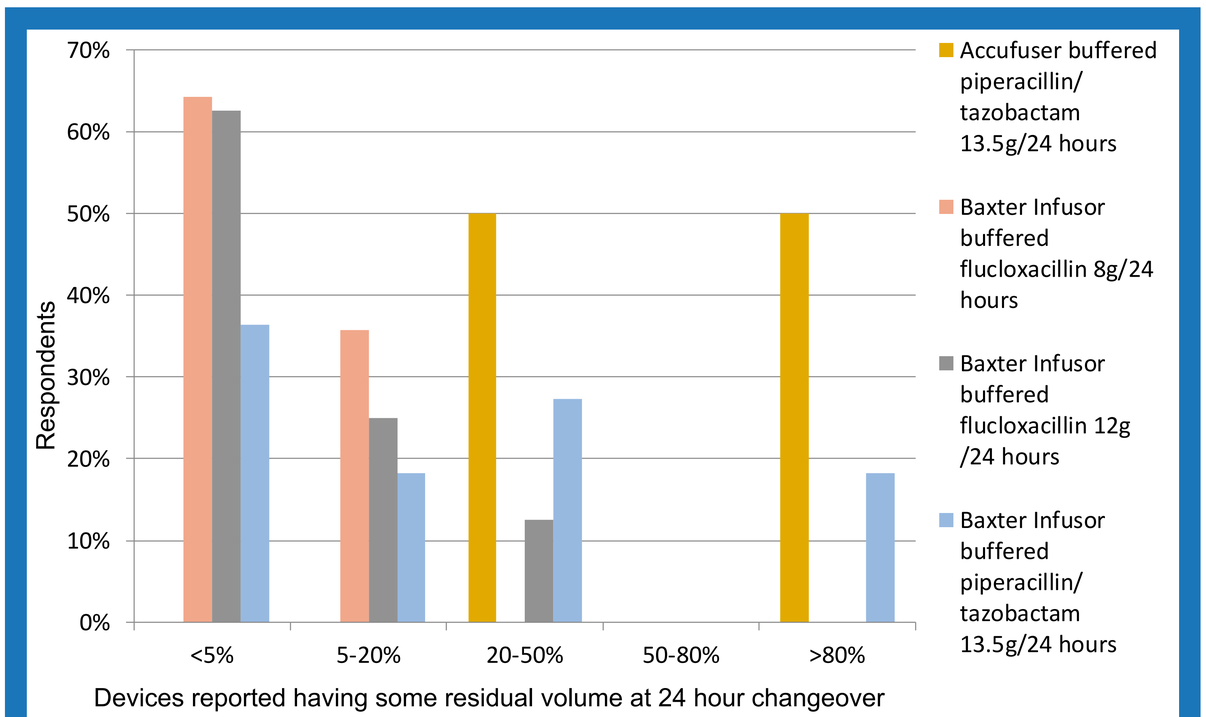

FIGURE 1. Percentage of doses with a residual volume remaining at the 24 hour changeover.

	Trusts using the device (n)	Devices in use/month from all respondents (total n)
Accufuser buffered piperacillin-tazobactam 13.5g/24 hours	1	31
Baxter Infusor buffered flucloxacillin 8g/24 hours	8	318
Baxter Infusor buffered flucloxacillin 12g /24 hours	2	56

TABLE 1. Elastomeric device usage amongst respondents.

	Respondents reporting the reason (n)	% of total
Choice/use of line	13	54%
Incorrect use of the device (e.g. temperature/position)	8	33%
Unsure	2	8%
Product defect	1	4%

TABLE 2. Reported reasons for devices not completely emptying by changeover (N.B. some respondents reported more than one reason).

	Respondents reporting the reason (n)	% of total
Patient/staff Education	11	58%
Observe	2	11%
Reported to manufacturer	2	11%
Adjust/change line	2	11%
Re-dose	1	5%
Reduce total volume	1	5%

TABLE 3. Remedial action employed/attributed reasons for devices not completely emptying by changeover (N.B. some respondents reported more than one action).

DISCUSSION

- This survey highlights the potential patient safety issue of incomplete dosing from continuous infusion elastomeric pumps and the importance of correct use.
- Beta-lactam antibiotics exhibit time-dependent killing, which is more achievable with prolonged or continuous infusion.[1,2]
- Continuous infusion may mitigate the effects of small residual volumes and therefore explain why some respondents reported that the reductions in total dose infused were not considered clinically significant.

CONCLUSIONS

- Incomplete beta-lactam 24 hour infusions via elastomeric pumps are recognised amongst UK OPAT practitioners and are generally attributed to suboptimal use of the elastomeric device or line-related issues.
- OPAT teams must be alert to this and consider early infusion device review to ensure optimal delivery of prescribed therapy.

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