Pilot introduction of 24 Hour Infusion of Flucloxacillin or Piperacillin/Tazobactam via elastomeric devices as an OPAT Treatment Pathway

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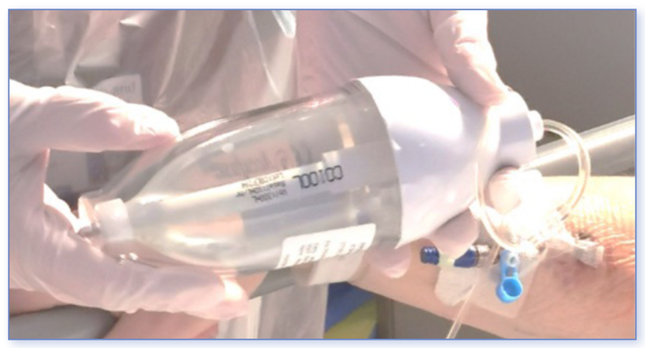
Background

Antibiotics with an administration schedule of three or four times daily are less suitable options for OPAT due to the number of visits required. These antibiotics may be the first line choice for the condition but are overlooked. Stability data supports administration of Flucloxacillin 8g or 12g and Piperacillin/tazobactam 13.5g and 18g via 24 hour elastomeric devices. This changes the treatment to a once daily schedule, which is suitable for OPAT.



Aims

Determine the cost effectiveness of 24 hour elastomeric devices in comparison to current service.

Establish a robust supply with continuous cold chain and traceability from manufacture to patient.

Evaluate the performance of elastomeric devices to deliver the prescribed dose within the construct of the OPAT service provided.

Develop systems to identify suitable patients, commence and monitor treatment, continue supply and collate information on unanticipated or adverse outcomes.

Method

An options appraisal and cost analysis for elastomeric devices available in Northern Ireland was produced. Following this two procurement methods were trialled:

1. Compounding within the aseptic unit of the BHSCT with quality approval for flucloxacillin and piperacillin/tazobactam filled vygon® accufuser® devices.
2. Commercial supply of flucloxacillin and piperacillin filled LV10 infusors compounded and supplied by Baxter, Dublin.

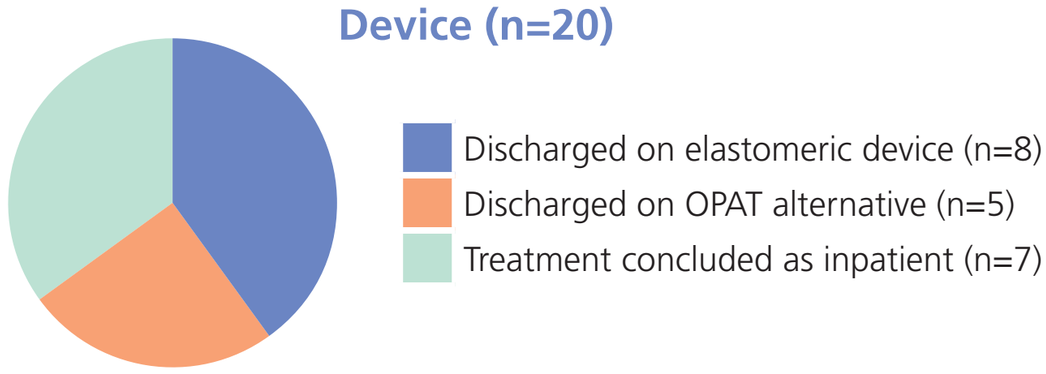
Patients were identified by the infectious diseases and microbiology doctors as suitable for treatment with either flucloxacillin or piperacillin/tazobactam for a minimum of 14 days. Treatment was initiated as an inpatient or in the ambulatory care centre with ongoing training for self-administration for patients who met the suitability criteria. All patients required a PICC line for administration.

Throughout the project policies, treatment plan and notes were developed, evaluated and updated using plan, do, study, act methodology. Feedback was obtained from all patients.

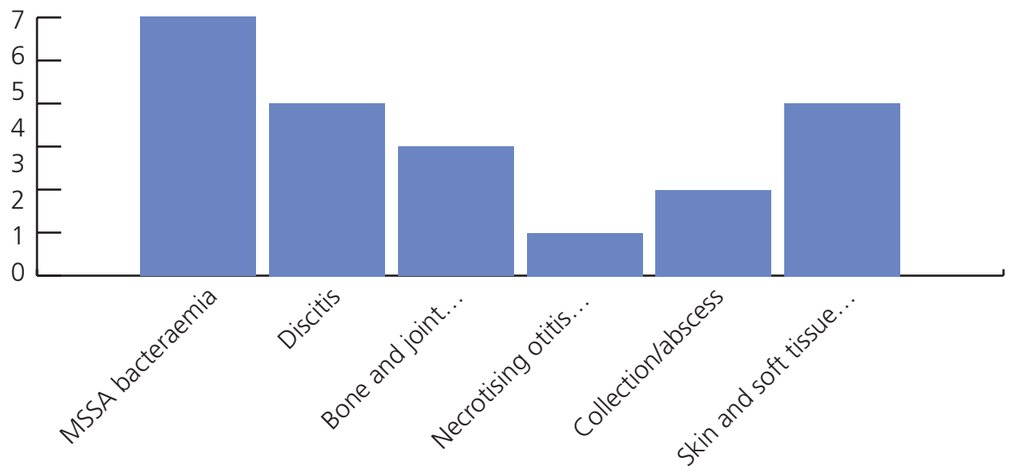
Results

Twenty patients were identified as suitable for administration of IV flucloxacillin or piperacillin/tazobactam via 24 hour elastomeric device between August 2020 and September 2021. Eight patients went on to receive treatment. The barriers to receiving treatment included; access to PICC line insertion, clinical deterioration so no longer suitable for OPAT and unable to travel daily to the ambulatory centre in Belfast. One patient did not start treatment as elastomeric devices could not be sourced. Three patients experienced problems with excess residual volume in the infusor at the end of the 24 hour treatment period. Patient A was treated with Flucloxacillin 8g/220ml Baxter LV10 infusor. Patient A was found to have the flow regulator in the wrong place and not taped to the skin, as recommended by the manufacturer. The flow improved with correct positioning of the flow regulator. Patient B was treated with Piperacillin/tazobactam 18g/240mls Vygon Accufusor. Patient B had repeated excess residual volumes up to 70mls and was stopped treatment early and switched to an alternative OPAT regimen. Patient C was treated with piperacillin/tazobactam 13.5g/220ml Baxter LV10 infusor. Patient C had issues with high excess residual volume (60mls) which did not improve with counselling, change to the IV access device or supervision. Treatment with the elastomeric device was stopped and the patient completed treatment in hospital.

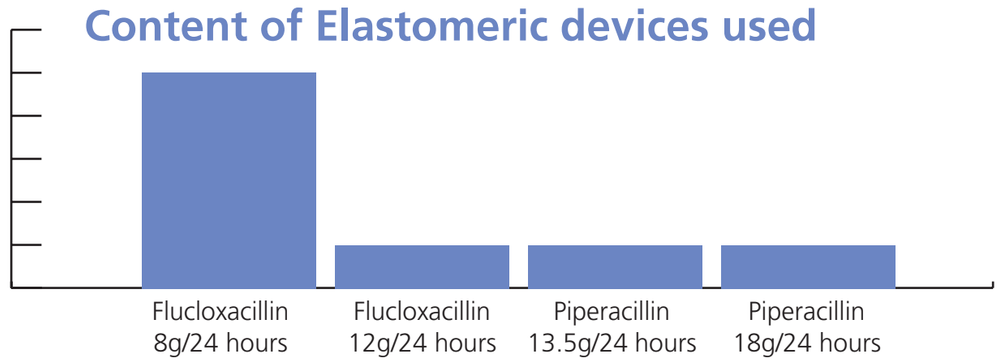
Outcomes for Patients Suitable for Elastomeric Device (n=20)



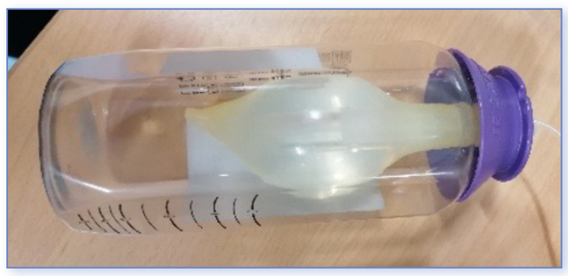
Indication for Treatment for Patients Suitable for Elastomeric Device



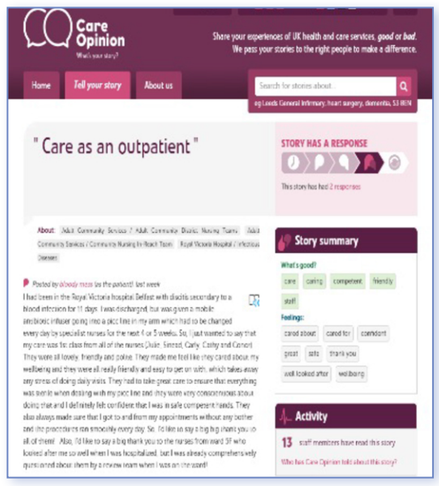
Content of Elastomeric devices used



Example of residual volume after 24 hours



"I was discharged, but was given a mobile antibiotic infuser going into a picc line in my arm which had to be changed every day by specialist nurses for the next 4 or 5 weeks. So, I just wanted to say that my care was 1st class from all of the nurses"



Discussion

The results of the pilot project demonstrate the challenges of continuing an operational service utilising elastomeric devices. The indication for treatment is only one of the suitability criteria to be met. Rapid reliable access to PICC line insertion or other suitable IV access device is an essential feature of the service. The total time from patient identification, suitability screening, IV access insertion, and order and delivery of the devices to starting treatment can be up to 7 days. In these circumstances, discharge via another, available OPAT pathway can be quicker with no significant impact on treatment outcome. Significant counselling, training and monitoring is required for patients using elastomeric devices. At present, the low number of patients who require an elastomeric restricts the allocation of resource to this purpose. Flucloxacillin was less commonly associated with excess residual volume than piperacillin/tazobactam during our pilot, however the numbers of patients treated are too low to draw conclusions.