Technology Guidance

Elastomeric Infusion Pumps

for outpatient parenteral antimicrobial therapy

Technology Guidance from the MOH Medical Technology Advisory Committee

Guidance Recommendations

The Ministry of Health's Medical Technology Advisory Committee has recommended elastomeric infusion pumps (EIPs) for patients requiring intravenous antimicrobials in line with the following criteria:

- ✓ Treatment is offered in non-inpatient settings, including the outpatient parenteral antimicrobial therapy (OPAT) clinic and at home;
- ✓ Treatment is supervised or supported by a multidisciplinary OPAT team;
- ✓ The individual or caregiver has received adequate education and training, and is assessed by the OPAT team to be capable of adhering to the prescribed treatment regimen; AND
- ✓ The antimicrobial used is shown to be stable with the EIP, based on reliable information sources including but not limited to, drug stability data compiled by the EIP manufacturer, HSA-approved antimicrobial product leaflets, and published drug stability studies.

Funding status

EIPs are recommended for subsidy for OPAT patients requiring intravenous antimicrobials, in line with the abovementioned recommendations.

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Factors considered to inform the recommendations

Technology evaluation

1.1. At the July 2024 meeting, the MOH Medical Technology Advisory Committee ("the Committee") considered the evidence presented for the technology evaluation of elastomeric infusion pumps (EIPs) in patients requiring intravenous (IV) antimicrobials but otherwise fit for discharge. The Agency for Care Effectiveness (ACE) conducted the evaluation in consultation with clinical experts from public healthcare institutions (PHIs). Published clinical and economic evidence was considered in line with the registered indication for EIPs.

1.2. The evidence was used to inform the Committee's deliberations around five core decision-making criteria:

- Clinical need of patients and nature of the condition;
- Overall benefit of the technology for the patient and/or the system;
- Cost-effectiveness (value for money), which considers the incremental benefit and cost of the technology compared to existing alternatives;
- Estimated annual technology cost and the number of patients likely to benefit from the technology; and
- Organisational feasibility, which covers the potential impact of adopting the technology, especially barriers for diffusion.

1.3. Additional factors, including social and value judgments, may also inform the Committee's deliberations.

Clinical need

2.1 Prolonged courses of IV antimicrobials are required for the treatment of serious and deep-seated infections when oral administration routes are insufficient to achieve adequate concentrations. Despite being eligible for discharge, some patients remain hospitalised solely to continue IV antimicrobial therapy. This is because standard IV therapy requires either inpatient care or frequent clinic visits, particularly for those needing multiple daily doses or prolonged infusions. This approach can be more resource-intensive, and can increase the risk of nosocomial infections.

2.2 EIPs offer a viable alternative to remaining hospitalised, by allowing continuous or frequent antimicrobial administration in outpatient settings. These single-use, portable, non-electronic pumps are designed for continuous infusion of medications or fluids to patients in various healthcare settings, including antimicrobial therapy for infections in outpatient, community or home settings. These devices address an unmet need by providing an alternative to standard IV therapy, reducing the risk of nosocomial infections and optimising healthcare resources.

Overall benefit of technology

3.1 The Committee acknowledged that for patients requiring IV antimicrobials but are otherwise fit for discharge, the main comparator to IV infusion with EIPs in OPAT is inpatient IV infusion using IV drips. The evidence base comprised three prospective observational studies and 11 retrospective reviews, all were non-comparative.

3.2 For safety, evidence indicated that EIPs are likely to have an acceptable safety profile, with no reported complications such as leakage or malfunction associated with the devices. For effectiveness, studies suggest that IV infusion with EIPs in OPAT is likely to be clinically effective. Although treatment failures, hospital readmissions and mortalities were reported, most were attributed to non-EIP-related reasons such as adverse drug effects, access line issues and pre-existing medical conditions. The total hospitalisation days avoided by patients receiving OPAT via EIPs were significant, potentially contributing to cost reduction, efficient utilisation of healthcare resources and prevention of nosocomial infection. The evidence also reported high levels of treatment satisfaction among patients who underwent OPAT via EIPs.

3.3 The Committee noted that the clinical evidence for EIPs was limited in quality and lacked comparative studies. However, local clinicians opined that the clinical safety and effectiveness of antimicrobial infusions mainly depend on the antimicrobials used rather than the infusion equipment.

Cost effectiveness

4.1 The Committee noted three published economic studies from Spain and the US, all focusing on cost savings related to the use of EIPs in OPAT. The evidence showed that OPAT via EIPs resulted in cost savings compared to inpatient therapy via IV drips. While differences in population size, treatment duration, and cost components made direct comparisons challenging, all three retrospective reviews consistently showed lower costs with OPAT via EIPs, despite variations in healthcare protocols and practices across countries and infections being treated.

4.2 The Committee noted that EIPs are currently reimbursed in Australia, Taiwan and South Korea, and is included in the list of contracted medical devices in New Zealand. The Committee also noted that prices for EIPs in Singapore were comparable to that of overseas jurisdictions.

Estimated annual technology cost

5.1 The Committee noted that the annual cost impact to the public healthcare system was estimated to be SG$1 million to <SG$5 million, based on an average treatment duration of four weeks and the projection of approximately 697 eligible patients in Singapore who would benefit from Government subsidy for EIPs.

5.2 The Committee noted that the net savings associated with OPAT via EIPs was estimated at SG$3 million to <SG$5 million per year, based on an average treatment duration of four weeks and the projection of approximately 697 eligible patients in Singapore who would benefit from Government subsidy for EIPs.

Organisational feasibility

6.1 The Committee noted that no organisational feasibility issues were identified. OPAT teams have established training programs and assessments to ensure patients and caregivers can perform infusions at home without the assistance of healthcare professionals. Established protocols for the administration of IV antimicrobials via EIP are available for both nurses and patients or caregivers. Each PHI is supported by a multidisciplinary team to oversee and facilitate OPAT treatment.These teams include consultant clinicians, pharmacists, nurses, vascular access teams, social workers, and other healthcare personnel.

Additional considerations

7.1 The Committee acknowledged that there were no ongoing or future trials on EIP use in OPAT, and that the clinical evidence base is unlikely to change substantially.

7.2 The Committee noted that two published clinical guidelines, the 2019 “UK Good Practice Recommendations for Outpatient Parenteral Antimicrobial Therapy (OPAT) in Adults and Children” and the 2018 “Clinical Practice Guideline for the Management of Outpatient Parenteral Antimicrobial Therapy” by the Infectious Diseases Society of America, currently recommend EIP use, especially for multiple daily antimicrobial doses, provided that the antimicrobials possess favourable physical and chemical characteristics, as well as stability in IV solution and in an EIP under storage and use conditions.

Recommendations

8.1 Based on available evidence, the Committee recommended subsidising EIPs used in OPAT given acceptable safety, clinical and cost effectiveness compared to inpatient therapy via IV drips. The Committee recommended subsidy for EIPs for patients requiring IV antimicrobial therapy in line with the following criteria:

- ✓ Treatment is offered in non-inpatient settings, including the OPAT clinic and at home;
- ✓ Treatment is supervised or supported by a multidisciplinary OPAT team;
- ✓ The individual or caregiver has received adequate education and training, and is assessed by the OPAT team as capable of adhering to the treatment regimen; and
- ✓ The antimicrobial used is shown to be stable with the EIP, based on reliable information sources including but not limited to, drug stability data compiled by the EIP manufacturer, HSA-approved antimicrobial product leaflets, and published drug stability studies.

Agency for Care Effectiveness - ACE Agency for Care Effectiveness (ACE)

About the Agency

The Agency for Care Effectiveness (ACE) was established by the Ministry of Health (Singapore) to drive better decision-making in healthcare through health technology assessment (HTA), clinical guidance, and education.

As the national HTA agency, ACE conducts evaluations to inform government funding decisions for treatments, diagnostic tests and vaccines, and produces guidance for public hospitals and institutions in Singapore.

The guidance is not, and should not be regarded as, a substitute for professional or medical advice. Please seek the advice of a qualified healthcare professional about any medical condition. The responsibility for making decisions appropriate to the circumstances of the individual patient remains with the healthcare professional.

Find out more about ACE at www.ace-hta.gov.sg/about

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