CADTH RAPID RESPONSE REPORT: REFERENCE LIST

Volumetric Cylinders versus Syringe Infusion Pumps for Administration of Intravenous Medication in Pediatric Patients: Clinical Effectiveness and Guidelines

Service Line:Rapid Response ServiceVersion:1.0Publication Date:November 17, 2020Report Length:5 Pages

Authors: Holly Gunn, Charlene Argáez

Cite As: Volumetric Cylinders versus Syringe Infusion Pumps for Administration of Intravenous Medication in Pediatric Patients: Clinical Effectiveness and Guidelines. Ottawa: CADTH; 2020 Nov. (CADTH rapid response report: reference list).

Disclaimer: The information in this document is intended to help Canadian health care decision-makers, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. While patients and others may access this document, the document is made available for informational purposes only and no representations or warranties are made with respect to its fitness for any particular purpose. The information in this document should not be used as a substitute for professional medical advice or as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process. The Canadian Agency for Drugs and Technologies in Health (CADTH) does not endorse any information, drugs, therapies, treatments, products, processes, or services.

While care has been taken to ensure that the information prepared by CADTH in this document is accurate, complete, and up-to-date as at the applicable date the material was first published by CADTH, CADTH does not make any guarantees to that effect. CADTH does not guarantee and is not responsible for the quality, currency, propriety, accuracy, or reasonableness of any statements, information, or conclusions contained in any third-party materials used in preparing this document. The views and opinions of third parties published in this document do not necessarily state or reflect those of CADTH.

CADTH is not responsible for any errors, omissions, injury, loss, or damage arising from or relating to the use (or misuse) of any information, statements, or conclusions contained in or implied by the contents of this document or any of the source materials.

This document may contain links to third-party websites. CADTH does not have control over the content of such sites. Use of third-party sites is governed by the third-party website owners' own terms and conditions set out for such sites. CADTH does not make any guarantee with respect to any information contained on such third-party sites and CADTH is not responsible for any injury, loss, or damage suffered as a result of using such third-party sites. CADTH has no responsibility for the collection, use, and disclosure of personal information by third-party sites.

Subject to the aforementioned limitations, the views expressed herein do not necessarily reflect the views of Health Canada, Canada's provincial or territorial governments, other CADTH funders, or any third-party supplier of information.

This document is prepared and intended for use in the context of the Canadian health care system. The use of this document outside of Canada is done so at the user's own risk.

This disclaimer and any questions or matters of any nature arising from or relating to the content or use (or misuse) of this document will be governed by and interpreted in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein, and all proceedings shall be subject to the exclusive jurisdiction of the courts of the Province of Ontario, Canada.

The copyright and other intellectual property rights in this document are owned by CADTH and its licensors. These rights are protected by the Canadian *Copyright Act* and other national and international laws and agreements. Users are permitted to make copies of this document for non-commercial purposes only, provided it is not modified when reproduced and appropriate credit is given to CADTH and its licensors.

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Questions or requests for information about this report can be directed to requests@cadth.ca

Research Questions

- 1. What is the comparative clinical effectiveness of volumetric cylinders compared with syringe infusion pumps for administration of intravenous medication in pediatric patients?
- 2. What are the evidence-based guidelines regarding volumetric cylinders or syringe infusion pumps for administration of intravenous medication in pediatric patients?

Key Findings

No literature was identified regarding the comparative clinical effectiveness of volumetric cylinders compared with syringe infusion pumps for administration of intravenous medication in pediatric patients. No evidence-based guidelines were identified regarding volumetric cylinders or syringe infusion pumps for administration of intravenous medication in pediatric patients.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including Medline and EMBASE via OVID, CINAHL, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were volumetric cylinders and infusion pumps for pediatric patients. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between January 1, 2015 and November 11, 2020. Internet links are provided where available.

Selection Criteria

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. Open access full-text versions of evidence-based guidelines were reviewed when abstracts were not available.

Population	Pediatric patients (17 and under)
Intervention	Volumetric cylinders (e.g., Buretrol, SoluSet, burette-type chamber, micro drip burette set)
Comparator	Syringe infusion pumps (e.g., smart infusion pumps)
Outcomes	Q1: Clinical effectiveness (e.g., safety, harms, accuracy of medication administration, medication mistakes, patient quality of life, medication effectiveness)
	Q2: Recommendations regarding choice of method for administration of medication
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

Table 1: Selection Criteria

Results

No health technology assessments, systematic reviews, randomized controlled trials, or non-randomized studies were identified regarding the comparative clinical effectiveness of volumetric cylinders compared with syringe infusion pumps for administration of intravenous medication in pediatric patients. No evidence-based guidelines were identified regarding volumetric cylinders or syringe infusion pumps for administration of intravenous medication in pediatric patients.

References of potential interest that did not meet the inclusion criteria are provided in the appendix.

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Previous CADTH Reports

 Li KX, Argáez C. Syringe driver smart pumps for intravenous therapy in acute settings: comparative clinical effectiveness, cost-effectiveness, and guidelines [CADTH rapid response report: summary of abstracts]. Ottawa (ON): CADTH; 2018 Nov: <u>https://www.cadth.ca/sites/default/files/pdf/htis/2018/RB1271%20Syringe%20Driver%2</u> <u>OSmart%20Pump%20Final.pdf</u> Accessed 2020 Nov 16.

Non-Randomized Study

No Comparator

 Okoro PE, Gbobo IF, Igwe PW, Umeh DU, Okoro CA, Nwiwu P. Accuracy of fluid delivery devices for the neonate: are the measures assured? *Niger J Clin Pract.* 2020 Aug;23(8):1044-1047.
<u>PubMed: PM32788479</u>

Guidelines & Recommendations

Unclear Methodology

- Institute for Safe Medication Practices (ISMP). Targeted medication safety best practices for hospitals. Horsham (PA): ISMP; 2020 Mar: <u>https://www.ismp.org/sites/default/files/attachments/2020-02/2020-2021%20TMSBP-%20FINAL 1.pdf</u> Accessed 2020 Nov 16. See: Best Practice 8, p.9
- BC Children's Hospital, BC Women's Hospital and Health Centre. Administration of IVIG via volumetric method. Vancouver (BC): Provincial Health Services Authority; 2018 Nov: <u>http://policyandorders.cw.bc.ca/resource-gallery/Documents/Transfusion%20Medicine/Administration-of%20-</u> IVIG_Volumetric_Nov-2018.pdf Accessed 2020 Nov 16.
- Thomas M, Nursing Clinical Effectiveness Committee. Peripheral intravenous (IV) device management. Victoria, Australia : The Royal Children's Hospital Melbourne ; 2018 Dec ; <u>https://www.rch.org.au/rchcpg/hospital clinical guideline index/Peripheral Intravenou</u> <u>s IV Device Management/</u> Accessed 2020 Nov 16. See: b) Administration of bolus/loading doses
- Agency for Clinical Innovation. Standards for paediatric intravenous fluids [guideline]. St. Leonard's, NSW, Australia: NSW Health; 2015 Aug: <u>https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2015_008.pdf</u> Accessed 2020 Nov 16. See: Section 5 "Fluid Bag Size and Intravenous Fluid Therapy Administration", p.3

Intervention Not Specified

 Infusion therapy standards of practice. J Infus Nurs. 2016 Jan/Feb;39(Suppl 1). https://source.yiboshi.com/20170417/1492425631944540325.pdf Accessed 2020 Nov 16. See: 24. Flow-Control Devices "Practice Criteria", p.S48