

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Intravenous Catheter Sizes for Fluid Resuscitation: Clinical Effectiveness and Guidelines

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Research Questions

1. What is the clinical effectiveness of 14 gauge intravenous catheters versus 16 gauge intravenous catheters for fluid resuscitation?
2. What are the evidence-based guidelines regarding the size of intravenous catheters for fluid resuscitation?

Key Findings

One non-randomized study was identified regarding the clinical effectiveness of 14 gauge intravenous catheters versus 16 gauge catheters for fluid resuscitation. No evidence-based guidelines were identified regarding the size of intravenous catheters for fluid resuscitation.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline, Embase, Cumulative Index to Nursing and Allied Health Literature (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 catheters and fluid resuscitation. For Q1, no filters were applied to limit the retrieval by study type. For Q2, search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, or network meta-analyses and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2015 and February 21, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1-2: Patients requiring rapid fluid resuscitation
Intervention	Q1-2: 14 gauge intravenous (IV) catheter
Comparator	Q1: 16 gauge IV catheter Q2 : Not applicable
Outcomes	Q1: Clinical effectiveness (e.g., decreased complications, patient stabilization, fluid retention) Q2: Recommendations regarding the size of IV catheter for fluid resuscitation.
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One non-randomized study¹ was identified regarding the clinical effectiveness of 14 gauge intravenous catheter versus 16 gauge catheter for fluid resuscitation. No relevant health technology assessments, systematic reviews, randomized controlled trials, or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One non-randomized study¹ was identified regarding the delivery flow rate of rapid infusion pump compared to a preset flow rate for different catheter sizes. The authors tested eight units of catheter type which included a 14 gauge and 16 gauge peripheral venous catheter.¹ Each catheter was connected to a rapid infusion pump and flow rates were measured and compared to preset flow rates.¹ The authors found that the flow rates of the rapid infusion pumps were lower than the preset flow rates except for the 14 gauge and 16 gauge catheters at 100 ml/min.¹ Therefore, the 14 gauge and 16 gauge catheters provided similar flow rates.¹

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

1. Le Noel A, Goffrais M, Almayrac A, Riou B, Langeron O, Raux M. Rapid infusion pump overestimates delivered flow during rapid vascular filling: a bench study. *Eur J Emerg Med.* 2015 Aug;22(4):260-265.
[PubMed: PM24910964](#)

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Clinical Practice Guidelines – Methodology Not Specified

2. Peripheral IV Catheter. Edmonton (AB): Covenant Health. 2017:
<http://extcontent.covenanthealth.ca/Policy/vii-b-390.pdf>
See: Guidelines for Selection IV Catheter Gauge, page 11.