



TITLE: Aspirating versus not Aspirating Prior to Injection of Medication: Comparative Clinical Evidence and Guidelines

DATE: 21 April 2014

RESEARCH QUESTIONS

1. What is the comparative clinical evidence regarding aspirating versus not aspirating prior to intramuscular injection of medication?
2. What is the comparative clinical evidence regarding aspirating versus not aspirating prior to subcutaneous injection of medication?
3. What are the evidence-based guidelines regarding aspiration prior to injection of medication?

KEY MESSAGE

One systematic review, two randomized controlled trials, one non-randomized study, and one evidence-based guideline were identified regarding the comparative clinical effectiveness of aspirating versus not aspirating prior to intramuscular or subcutaneous injection of medication.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 4), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No methodological filters were applied to limit retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2004 and April 7, 2014.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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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 systematic review, two randomized controlled trials, one non-randomized study, and one evidence-based guideline were identified regarding the comparative clinical effectiveness of aspirating versus not aspirating prior to intramuscular or subcutaneous injection of medication. No health technology assessments were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One systematic review¹ that examined vaccine injection techniques to reduce pain in children suggested rapid intramuscular (IM) vaccine injection without aspiration as one method to achieve this objective.

Two randomized controlled trials^{2,3} that compared the pain response in infants following “standard” slow IM vaccine injection with aspiration or “pragmatic” fast IM vaccine injection without aspiration were identified. The results demonstrated that a rapid injection technique without aspiration was associated with less acute pain than slow IM injection with aspiration.^{2,3} The authors recommended the use of the pragmatic IM injection technique for routine infant immunizations.³

One non-randomized study⁴ assessed the effects of four techniques for subcutaneous heparin injections on bruising and pain. The authors observed that performing the air lock injection method without aspiration followed by application of cold to the area surrounding the site reduced the incidence or severity of these adverse events.

One guideline⁵ from the Canadian Medical Association regarding reducing pain in childhood vaccinations was identified. It states that aspiration is not necessary for IM injections because the recommended anatomic sites for IM injections do not contain major blood vessels and it may increase pain when paired with slow injection. Rapid injection without aspiration is thus recommended to reduce pain in children undergoing IM vaccination.

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Taddio A, Ilersich AL, Ipp M, Kikuta A, Shah V, HELPinKIDS Team. Physical interventions and injection techniques for reducing injection pain during routine childhood immunizations: systematic review of randomized controlled trials and quasi-randomized controlled trials. Clin Ther [Internet]. 2009 [cited date 2014 Apr 7];31 Suppl 2:S48-S76. [http://www.clinicaltherapeutics.com/article/S0149-2918\(09\)00263-X/pdf](http://www.clinicaltherapeutics.com/article/S0149-2918(09)00263-X/pdf)
Structured abstract available from:
www.crd.york.ac.uk/CRDWeb/ShowRecord.asp?AccessionNumber=12009110173#.Uz9KqSg2H3U

Randomized Controlled Trials

2. Girish GN, Ravi MD. Vaccination Related Pain: Comparison of Two Injection Techniques. Indian J Pediatr. 2014 Mar 23. [ePub ahead of print].
3. Ipp M, Taddio A, Sam J, Gladbach M, Parkin PC. Vaccine-related pain: randomised controlled trial of two injection techniques. Arch Dis Child.[Internet] 2007 Dec [cited date 2014 Apr 7];92(12):1105-8. Available from:
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2066084>

Non-Randomized Studies

4. Avsar G, Kasikci M. Assessment of four different methods in subcutaneous heparin applications with regard to causing bruise and pain. Int J Nurs Pract. 2013 Aug;19(4):402-8.

Guidelines and Recommendations

5. Taddio A, Appleton M, Bortolussi R, Chambers C, Dubey V, Halperin Bortolussi, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ. [Internet]. 2010 Dec 14 [cited date 2014 Apr 4];182(18):E843-55. Available from: <http://www.cmaj.ca/content/182/18/E843.full.pdf>
See 5. Intramuscular injection techniques, pg E847

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APPENDIX – FURTHER INFORMATION:

Systematic Reviews and Meta-analyses – No Explicit Mention of Aspiration

6. Wynaden D, Landsborough I, Chapman R, McGowan S, Lapsley J, Finn M. Establishing best practice guidelines for administration of intra muscular injections in the adult: a systematic review of the literature. *Contemp Nurse*. 2005;20(2):267-77.

Non-Randomized Studies – Alternate Outcomes

7. Moores P, Allan P. Affecting change through continuing education: improving vaccine administration technique. *J Contin Educ Nurs*. 2012 Sep;43(9):395-400.

Clinical Practice Guidelines - Unclear Methodology

8. Xue Y, Campbell J, Carroll M. Intramuscular Injection: Aspiration [Internet]. Adelaide: Joanna Briggs Institute; 2014. [cited date 2014 Apr 7]. Available from: <http://joannabriggs.org/>
9. Canadian Immunization Guide Part 1. Key Immunization Information 2013: Vaccine Administration Practices: Route, site and technique for vaccine administration. [Internet]. Winnipeg: Public Health Agency of Canada; 2013. [cited date: 2014 Apr 6]. Available from: <http://www.phac-aspc.gc.ca/publicat/cig-gci/p01-07-eng.php>
See: Section - Route, site and technique for vaccine administration, Table 4 and subsection - Rapid injection without aspiration
10. Vaccine Administration. [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; 2012. [cited date: 2014 Apr 6]. Available from: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/d/vacc_admin.pdf
See: Section - Route and Site, subsection - Intramuscular (IM) Route (third paragraph), Intradermal (ID) Route (under Technique)

Review Articles

11. Davidson KM, Rourke L. Teaching best-evidence: Deltoid intramuscular injection technique. *Journal of Nursing Education and Practice*. [Internet]. 2013 [cited date 2014 Apr 6]; 3(7): 120-128.
Available from: <http://www.sciedu.ca/journal/index.php/jnep/article/viewFile/1888/1291>
See: Needle aspiration, pg. 124
12. Crawford CL, Johnson A. To aspirate or not: An integrative review of the evidence. *Nursing Critical Care*. [Internet]. 2012 Sep [cited date 2014 Apr 3]; 7(5): 9–15. Abstract: <http://littletonnhospital.org/images/NursesPages/files/Crawford,%20CL;%20Johnson,%20JA,%20Nursing%202012,%20March%2820-25%29.pdf>
Related presentation: <http://www.stti.iupui.edu/pp07/vancouver09/41810.Crawford,%20Cecelia%20L.-F%202010.pdf>

Additional References

13. Malkin B. Are techniques used for intramuscular injection based on research evidence? Nurs Times. 2008;104(50/51):48-51.
14. Ipp M, Sam J, Parkin PC. Needle aspiration and intramuscular vaccination. Arch Pediatr Adolesc Med. 2006 Apr;160(4):451.