To Aspirate or Not to Aspirate
That is the Question:
An Integrative Review of the Evidence

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STTI International Nursing Research Congress
Vancouver, July 2009
Evidence Reviews

Integrative Review (18):

- A review via a systematic approach that uses a detailed search strategy to find relevant evidence to answer a targeted clinical question
- Evidence can come from RCTs, observational studies, qualitative research, clinical experts, and other types of evidence
- Does not use summary statistics
Questions by nurse educators:

“Why am I still teaching blood aspiration during medication injection in nursing orientation?”

“I was taught to aspirate in nursing school. Do I still need to do this?”
Integrative Review Purpose & Aim

To determine the quality of the evidence for aspiration of blood during subcutaneous (SC) and intramuscular (IM) medication administration

Ultimate aim of developing global best practice standards and guidelines for the ambulatory care setting
The practice of aspiration of blood during injections is a tradition that has been taught in nursing for the past 40 years. This precautionary technique is performed to ensure that a low flow blood vessel or artery has not been penetrated.
The practice of aspiration has been added and eliminated based on anecdote, assumption, and arbitrary choice for decades and is not based on scientific evidence\(^{(1,3,8,11)}\).

No studies confirm or reject current aspiration techniques & no data currently exists to document the necessity for aspiration\(^{(1,5,8,11)}\).
Examined the aspiration technique for SC and IM injections, primarily involving vaccine and immunization administration, in the ambulatory care setting.

A 2000-2008 review of the research evidence via electronic databases used the search terms of “aspiration”, “subcutaneous”, “intramuscular”, and “injections”.
Synthesis of the Evidence

Key Web Search Terms
('Aspiration', 'Subcutaneous', 'Intramuscular', 'Injections')

Search Term Results

- National KP Guidelines (75 articles found)
- PubMed (24 articles found)
- Ovid (128 articles found)
- CINAHL (79 articles found)
- Cochrane Central Registers of Controlled Trials (0 articles found)

Total Articles Retrieved: 306
Relevant: 7
Synthesis of the Evidence

Levels of Studies

- Systematic Reviews/Meta-Analysis of Randomized Controlled Trials
- Large Sample Randomized Controlled Trials
- Small Sample Randomized Controlled Trials
- Non-random, Controlled Prospective Studies
- Non-random, Controlled Retrospective Studies
- Cohort Studies
- Case-Controlled Studies
- Non-Controlled, Clinical, Descriptive Studies
- Case Studies
- Expert Consensus, Manufacturers Recommendations (Lit reviews)
- Anecdotes

Adapted from: Canadian Medical Association & Centre for Evidence-Based Medicine (2001)
Strength of the Evidence

Using an internal KP quantitative grading schema, the strength of the research evidence ranged from insufficient to fair.

Final grade for body of the evidence: Insufficient
Strength of the Evidence

Review limitations – relatively narrow focus of administered medications, mainly vaccines, immunizations, insulin and penicillin
Clinical Expert Critique

Dr. Linda Diggle (3)
Immunisation Nurse Specialist
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- Internationally known expert in injection procedures & technique
- Critiqued integrative review findings & recommendations
- Her clinical judgment and expert opinion is validated by the evidence captured in this review
Results: Key Summary of the Evidence

Aspiration may not be a reliable indicator of correct needle placement\(^{11}\)

Aspiration during subcutaneous injection is not necessary\(^{2,7,8,11,14}\)

There is no reported evidence that aspiration with or without blood return \(^{8,11}\)

- confirms needle placement
- eliminates the possibility of an intramuscular injection into a non-subcutaneous blood vessel
Fears of adverse reactions following non-aspiration of intramuscular injections mainly center on intra-arterial injection of penicillin and other large molecule medications (4,6,9,10,13).
Most nurses do not follow slow aspiration guidelines and perform the procedure too quickly for it to be effective\(^5\).

**Ten Second Rule:**
- Slow aspiration (5-10 seconds)
- Slow injection (5-10 seconds)
- Slow withdrawal, no rubbing

How many nurses do this?
Use of jet injection for delivery of vaccines and immunizations does not involve the aspiration technique\(^{(1)}\)
Recommendations for Consideration

Aspiration is not indicated for SC injections of vaccines, immunizations and insulin\(^{(2,8)}\)

Aspiration is not indicated for IM injections of vaccines and immunizations\(^{(2,5)}\)

Aspiration *may* be indicated for IM injections of large molecule medications, such as penicillin\(^{(4,10,13)}\)
Recommendations for Consideration

Until a standard can be determined, injection techniques must be individualized to the patient, the equipment, and the medication being administered in order to decrease the risk of incorrect needle placement\(^{(3,11,13,14,15)}\)
Significance to Patient Care

These aspects are particularly important in the pediatric population, which receives the majority of vaccines and immunizations\(^{(5)}\).

Elimination of the aspiration technique has the potential to\(^{(2,5,14)}\):

- Reduce injection, duration time & decrease injection pain
- Increase medication injection compliance
Significance to Patient Care

Although the practice of aspiration is advocated by some experts, the procedure is not required because no large blood vessels exist at the recommended injection sites\(^{3,8,15}\).

Organizations which state aspiration is not necessary for immunizations & vaccines are\(^{(1,3,15)}\):

- Centers for Disease Control (CDC)
- Advisory Committee on Immunization Practices (ACIP)
- Department of Health Services (DHS)
- American Academy of Family Physicians (AAFP)
- U.K. Department of Health (DoH)
- World Health Organization (WHO)
Further Research

The primary reliance on conflicting best practice guidelines reflects the need for more research in this deceptively routine patient care procedure.

However, it is highly unlikely a randomized control trial will answer this question, due to patient safety issues and the extremely large sample size required to detect this rare major adverse event\(^{(5)}\).
Final Steps: Finish Line!

Ultimate Goals

KP Ambulatory Clinical Practice Committee
Inclusion in KP Clinical Practice Guidelines
- Incorporate changes throughout KP SCAL Region Ambulatory Care
Disseminate information to ambulatory practice leaders & educators
Acknowledgements

We wish to thank

Anna Omery, RN, DNSc, CNAA-BC

Terry Bream, RN, MN

for their support of this project
For More Information…

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Questions?
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