

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Point of Care Ultrasound for Assessment of Patients with Obstetrical Issues in Emergency Departments: Clinical Utility and Cost- Effectiveness

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Research Questions

1. What is the clinical utility of point of care ultrasound for the assessment of patients with obstetrical issues in the emergency department?
2. What is the cost effectiveness of point of care ultrasound for the assessment of patients with obstetrical issues in the emergency department?

Key Findings

Two systematic reviews, one randomized controlled trial, and one non-randomized study were identified regarding the clinical utility of point of care ultrasound for the assessment of patients with obstetrical issues in the emergency department. No relevant economic evaluations were identified regarding the cost effectiveness of point of care ultrasound for the assessment of patients with obstetrical issues in the emergency department.

Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE All (1946–) via Ovid, Embase (1974–) via Ovid, 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 point-of-care ultrasound and obstetric/pregnancy complications. No filters were applied to limit the 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 01, 2009 and August 27, 2019. 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	Adult patients presenting to emergency departments with known or suspected obstetrical issues including ectopic pregnancy (e.g., vaginal bleeding)
Intervention	Point of care ultrasound in the emergency department
Comparator	Q1-Q2: Ultrasound performed in the radiology ward (also known as radiology-performed ultrasound); no ultrasound

Outcomes	Q1: Clinical utility (safety, maternal mortality, fetal mortality, birthing complications (e.g., hemorrhage), length of stay, time to transfer from emergency department, harms/benefits) Q2: Cost-effectiveness
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations

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 economic evaluations.

Two systematic reviews,^{1,2} one randomized controlled trial,³ and one non-randomized study⁴ were identified regarding the clinical utility of point of care ultrasound for the assessment of patients with obstetrical issues in the emergency department. No relevant health technology assessments, meta-analyses, or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Two systematic reviews,^{1,2} one randomized controlled trial³ and one non-randomized study⁴ were identified regarding the clinical utility of point of care ultrasound (POCUS) for the assessment of patients with obstetrical issues in the emergency department. The authors of the first systematic review and meta-analysis aimed to assess the impact of pelvic POCUS compared to radiologist performed ultrasound on patient emergency department length of stay (LOS).¹ The authors found that the use of pelvic POCUS evaluation in the emergency department was associated with decreased LOS in patients with symptomatic early pregnancies that ultimately were diagnosed as intrauterine pregnancies.¹ The authors of a second systematic review found that POCUS in the emergency department was clinically useful in reducing the frequency of missed ectopic pregnancy, decreasing time to surgery for ectopic pregnancy, and shortening length of stay for patients with normal pregnancies.² The authors also found that POCUS may be more cost-effective than other diagnostic strategies such as formal ultrasound.² Authors of a randomized controlled trial also examined the impact of POCUS in comparison to radiology performed ultrasound on LOS for patients evaluated for intrauterine pregnancy.³ The authors found that patients who received POCUS in the emergency department had a shorter LOS by 20 minutes than patients receiving ultrasound in the radiology department; however, this finding was not statistically significant.³ Authors of a prospective non-randomized study also compared POCUS and radiology performed ultrasound on LOS and found that POCUS resulted in a significant decrease in time to ultrasound, and a significant decrease in LOS in the emergency department.⁴

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Beals T, Naraghi L, Grossestreuer A, Schafer J, Balk D, Hoffmann B. Point of care ultrasound is associated with decreased ED length of stay for symptomatic early pregnancy. *Am J Emerg Med.* 2019 Jun;37(6):1165-1168.
[PubMed: PM30948256](#)
2. McRae A, Murray H, Edmonds M. Diagnostic accuracy and clinical utility of emergency department targeted ultrasonography in the evaluation of first-trimester pelvic pain and bleeding: a systematic review. *CJEM.* 2009 Jul;11(4):355-364.
[PubMed: PM19594975](#)

Randomized Controlled Trials

3. Morgan BB, Kao A, Trent SA, et al. Effect of emergency physician-performed point-of-care ultrasound and radiology department-performed ultrasound examinations on the emergency department length of stay among pregnant women at less than 20 weeks' gestation. *J Ultrasound Med.* 2018 Nov;37(11):2497-2505.
[PubMed: PM29574878](#)

Non-Randomized Studies

4. Wilson SP, Connolly K, Lahham S, et al. Point-of-care ultrasound versus radiology department pelvic ultrasound on emergency department length of stay. *World J Emerg Med.* 2016;7(3):178-182.
[PubMed: PM27547276](#)

Economic Evaluations

No literature identified.

Appendix — Further Information

Previous CADTH Reports

5. Point-of-care testing: summary of evidence - January 2019 update. Ottawa (ON): CADTH; 2019: https://www.cadth.ca/sites/default/files/pdf/PoC_summary-of-evidence-e-jan2019.pdf. Accessed 2019 Sep 06.
6. Point-of-care testing: summary of evidence. Ottawa (ON): CADTH; 2017: https://www.cadth.ca/sites/default/files/pdf/point_of_care_testing_summary_of_evidence_e_e.pdf. Accessed 2019 Sep 06.
7. Portable ultrasound devices use by non-radiologists: clinical evidence and guidelines. (*CADTH rapid response report: summary of abstracts*). Ottawa (ON): CADTH; 2016: <https://www.cadth.ca/sites/default/files/pdf/htis/mar-2016/RB0971%20Portable%20US%20by%20Non-Radiologists%20Final.pdf>. Accessed 2019 Sep 06.
8. Portable ultrasound devices in the pre-hospital setting: a review of clinical and cost-effectiveness and guidelines. (*CADTH rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2015: <https://www.cadth.ca/sites/default/files/pdf/htis/may-2015/RC0662%20Portable%20Ultrasound%20Devices%20Final.pdf>. Accessed 2019 Sep 06.
9. Evidence on point-of-care testing. (*CADTH evidence bundles*). Ottawa (ON): CADTH; 2019: <https://cadth.ca/evidence-bundles/point-care-testing>. Accessed 2019 Sep 06.

Systematic Reviews and Meta-Analyses – Diagnostic Accuracy

10. Stein JC, Wang R, Adler N, et al. Emergency physician ultrasonography for evaluating patients at risk for ectopic pregnancy: a meta-analysis. *Ann Emerg Med*. 2010 Dec;56(6):674-683.
[PubMed: PM20828874](#)

Non-Randomized Studies

Population Not Specified

11. Reynolds TA, Amato S, Kulola I, Chen CJ, Mfinanga J, Sawe HR. Impact of point-of-care ultrasound on clinical decision-making at an urban emergency department in Tanzania. *PLoS One*. 2018;13(4):e0194774.
[PubMed: PM29694406](#)
12. Thamburaj R, Sivitz A. Does the use of bedside pelvic ultrasound decrease length of stay in the emergency department? *Pediatr Emerg Care*. 2013 Jan;29(1):67-70.
[PubMed: PM23283267](#)

Alternative Setting

13. Michon A, Jammal S, Passeron A, et al. Use of pocket-sized ultrasound in internal medicine (hospitalist) practice: feedback and perspectives. *Rev Med Interne*. 2019 April;40(4):220-225.
[PubMed:PM30078545](#)

14. Dalmacion GV, Reyles RT, Habana AE, et al. Handheld ultrasound to avert maternal and neonatal deaths in 2 regions of the Philippines: an iBuntis intervention study. *BMC Pregnancy Childbirth*. 2018 01 18;18(1):32.
[PubMed: PM29347926](#)

No Comparator

15. Varner C, Balaban D, McLeod S, Carver S, Borgundvaag B. Fetal outcomes following emergency department point-of-care ultrasound for vaginal bleeding in early pregnancy. *Can Fam Physician*. 2016 Jul;62(7):572-578.
[PubMed: PM27829074](#)

Diagnostic Accuracy

16. Bruns RF, Menegatti CM, Martins WP, Araujo Junior E. Applicability of pocket ultrasound during the first trimester of pregnancy. *Med Ultrason*. 2015 Sep;17(3):284-288.
[PubMed: PM26343074](#)
17. Saul T, Lewiss RE, Rivera Mdel R. Accuracy of emergency physician performed bedside ultrasound in determining gestational age in first trimester pregnancy. *Crit Ultrasound J*. 2012 Dec 06;4(1):22.
[PubMed: PM23216683](#)
18. Sayasneh A, Preisler J, Smith A, et al. Do pocket-sized ultrasound machines have the potential to be used as a tool to triage patients in obstetrics and gynecology? *Ultrasound Obstet Gynecol*. 2012 Aug;40(2):145-150.
[PubMed:PM22605511](#)

Alternative Outcome

19. Shah S, Teismann N, Zaia B, et al. Accuracy of emergency physicians using ultrasound to determine gestational age in pregnant women. *Am J Emerg Med*. 2010 Sep;28(7):834-838.
[PubMed: PM20837264](#)

Qualitative Studies – Surveys

20. Shokoohi H, Raymond A, Fleming K, et al. Assessment of point-of-care ultrasound training for clinical educators in Malawi, Tanzania and Uganda. *Ultrasound Med Biol*. 2019 06;45(6):1351-1357.
[PubMed: PM30904246](#)

Review Articles

21. Whitson MR, Mayo PH. Ultrasonography in the emergency department. *Crit Care*. 2016 08 15;20(1):227.
[PubMed: PM27523885](#)
22. Stolz LA, Nicola R. Point-of-care pelvic ultrasonography in emergency medicine. *Ultrasound Clin*. 2014 April;9(2):173-184.
23. Laurich VM, Tsung JW. Point-of-care first trimester pelvic ultrasonography for the pediatric emergency physician. *Clin Pediatr Emerg Med*. 2011 March;12(1):18-26.