Emergency department ultrasound (EDU): clinical adjunct or plaything?

R McLaughlin, N Collum, S McGovern, C Martyn, J Bowra

Background: Emergency department ultrasound (EDU) is a physician performed ultrasound service aimed at improving patient flow and diagnosis in the emergency department.

Methods: This paper describes the initial phase of the introduction of EDU with three illustrative case reports and a discussion on the pitfalls and benefits of EDU.

Results and discussion: In three cases discussed here, the use of EDU facilitated treatment and reduced the need for formal radiological scanning. While there are drawbacks to EDU, we believe these are far outweighed by the advantages, and in a recent survey of emergency medicine consultants throughout Ireland, the vast majority were in favour of its introduction.

Conclusion: EDU has become a routine part of our clinical practice, and although we are still on a learning curve with regard to its use, we have experienced significant benefits in patient care. With technological advances (such as improved image resolution and teleradiology) the potential for EDU will continue to expand, but training, practice, accreditation, and audit are essential.

METHODS

The ED in the Ulster Hospital, Belfast receives approximately 70 000 attendances/year, and treats a wide spectrum of adult and paediatric disease, including major trauma. In July 2003, a pilot EDU service was introduced to the ED. The radiology department of the Ulster Hospital agreed to co-operate in its implementation, and to provide ongoing quality assurance. Five ED doctors attended a 1 day ultrasound scanning course that provided an introduction to its use and showcased some of the available scanners. This course was facilitated by a consultant radiologists, who (with their sonographers) provided ongoing training. The training required was individually tailored to suit the learners’ needs. For example, a specialist registrar wishing to develop a number of applications such as aortic aneurysm, free abdominal fluid, hip effusion, and deep vein thrombosis was seconded to the radiology department for 3 months. In contrast, a consultant simply wishing to detect paediatric hip effusions was producing diagnostic quality images after performing 20 examinations supervised by a radiologist. In the absence of agreed UK accreditation guidelines, the American College of Emergency Physicians (ACEP) guidelines were followed: 25 examinations for the first application and then a further 25 for any new application required by the EDU practitioner.1 Departmental guidelines were introduced, covering indications, techniques, and acceptable views for EDU. The principles of quality assurance were firmly laid down within the department, and no doctor was allowed to perform EDU unless they had attended the 1 day course and were enrolled in the quality assurance process. This ongoing process includes a fortnightly meeting between the emergency and radiology departments whereby all ultrasound images are reviewed, and feedback is provided to the EDU practitioners. Currently the ED has five doctors enrolled in the EDU process, and diagnostic images are regularly produced for a number of applications as demonstrated by the following cases.

Case studies

Case 1

A 70 year old normotensive man presented with severe back pain and rigid abdomen. EDU demonstrated an 8 cm AAA (fig 1A). He was immediately referred to a consultant vascular surgeon and taken directly to theatre for successful AAA repair without recourse to CT scan, which would have delayed surgery.

Case 2

A 4 year old boy presented with a non-traumatic painful limp and a mild fever. Radiographs were normal, EDU revealed a...
large effusion of the right hip (fig 1B). The child was then admitted directly for drainage of his hip effusion without the need for formal radiology department scanning.

Case 3
A 71 year old man presented with a 3 month history of painful swelling over the dorsum of the proximal interphalangeal joint of his right little finger. Radiographs revealed no abnormality. EDU revealed a foreign body in the soft tissues (fig 1C). The patient was then referred directly for removal.

DISCUSSION
EDU is an imaging modality with a range of benefits in emergency medicine. It is rapid, safe, non-invasive, and repeatable. It requires no contrast media and no special patient preparation. Benefits include earlier identification of life threatening conditions and streamlined patient care. Patients with traumatic haemoperitoneum or abdominal aortic aneurysm may be accurately identified in the ED. Cardiac tamponade can be rapidly diagnosed and treated.

Additional benefits to clinicians such as surgeons and emergency doctors include continuing professional development and the satisfaction of a broadened skills repertoire. Radiology departments may benefit from decreased demand for out of hours emergency imaging.

Drawbacks may be encountered as with any new technology, in particular the recognition of the limitations of this service. EDU can provide answers to specific, binary (yes/no) questions only. For instance, it can demonstrate the presence or absence of free intraabdominal fluid in the patient with blunt trauma, but not reliably reveal the cause.

There is a criticism that EDU is not core work for the emergency physician and should be provided by radiographers or radiologists on a 24 hour basis. However, this is impractical in most institutions, and we consider that the immediate availability of an emergency clinician trained in the use and interpretation of EDU represents a more practical alternative. This is of particular relevance in light of the trends toward increased out of hours clinical work by senior ED clinicians.

Other potential difficulties include inappropriate requests for scans from colleagues, and the risk of misdiagnosis. However, such issues can be addressed through education and quality control. There is international consensus that the benefits of EDU outweigh its disadvantages, and that EDU is a useful adjunct to clinical practice in the ED.

We recently surveyed all consultants in emergency medicine on the whole island of Ireland, and found the vast majority to be in favour of the introduction of EDU. Perceived difficulties in its introduction included finance, support by radiologists, and cultural change. Furthermore, there was an almost unanimous request for national guidelines in EDU practice and accreditation.

CONCLUSION
EDU has become a routine part of clinical practice in the Ulster Hospital ED. We are still on a learning curve with regard to its use. However, we have experienced significant benefits in patient care.

Potential future directions for EDU include broadening its scope to include conditions such as deep venous thrombosis. For physicians who engage in central venous access, the future use of ultrasound is now a national guideline. With technological advances (such as improved image resolution and teleradiology) the potential for EDU will continue to expand. Finally, for EDU to become a useful clinical adjunct we conclude that training, practice, accreditation, and audit are essential. Without these, it may well remain a plaything.

Authors’ affiliations
Ulster Hospital, Belfast, UK
R McLaughlin, N Collum, S McGovern, C Martyn, J Bowra

Competing interests: none declared

REFERENCES
Clinical Evidence—Call for contributors

Clinical Evidence is a regularly updated evidence-based journal available worldwide both as a paper version and on the internet. Clinical Evidence needs to recruit a number of new contributors. Contributors are healthcare professionals or epidemiologists with experience in evidence-based medicine and the ability to write in a concise and structured way.

Areas for which we are currently seeking authors:

- Child health: nocturnal enuresis
- Eye disorders: bacterial conjunctivitis
- Male health: prostate cancer (metastatic)
- Women’s health: pre-menstrual syndrome; pyelonephritis in non-pregnant women

However, we are always looking for others, so do not let this list discourage you.

Being a contributor involves:

- Selecting from a validated, screened search (performed by in-house Information Specialists) epidemiologically sound studies for inclusion.
- Documenting your decisions about which studies to include on an inclusion and exclusion form, which we keep on file.
- Writing the text to a highly structured template (about 1500–3000 words), using evidence from the final studies chosen, within 8–10 weeks of receiving the literature search.
- Working with Clinical Evidence editors to ensure that the final text meets epidemiological and style standards.
- Updating the text every six months using any new, sound evidence that becomes available.
- To expand the topic to include a new question about once every 12–18 months.

If you would like to become a contributor for Clinical Evidence or require more information about what this involves please send your contact details and a copy of your CV, clearly stating the clinical area you are interested in, to Klara Brunnhuber (kbrunnhuber@bmjgroup.com).

Call for peer reviewers

Clinical Evidence also needs to recruit a number of new peer reviewers specifically with an interest in the clinical areas stated above, and also others related to general practice. Peer reviewers are healthcare professionals or epidemiologists with experience in evidence-based medicine. As a peer reviewer you would be asked for your views on the clinical relevance, validity, and accessibility of specific topics within the journal, and their usefulness to the intended audience (international generalists and healthcare professionals, possibly with limited statistical knowledge). Topics are usually 1500–3000 words in length and we would ask you to review between 2–5 topics per year. The peer review process takes place throughout the year, and our turnaround time for each review is ideally 10–14 days.

If you are interested in becoming a peer reviewer for Clinical Evidence, please complete the peer review questionnaire at www.clinicalevidence.com or contact Klara Brunnhuber (kbrunnhuber@bmjgroup.com).
Emergency department ultrasound (EDU): clinical adjunct or plaything?

R McLaughlin, N Collum, S McGovern, C Martyn and J Bowra

doi: 10.1136/emj.2004.014241

Updated information and services can be found at:
http://emj.bmj.com/content/22/5/333

These include:

References
This article cites 6 articles, 0 of which you can access for free at:
http://emj.bmj.com/content/22/5/333#BIBL

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections

Clinical diagnostic tests (1056)
Patients (224)
Radiology (1002)
Radiology (diagnostics) (903)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/