Original Research

What makes a good ultrasound report?

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Abstract

It is essential for the management of the patient that ultrasound practitioners produce reports based on their examinations that are accurate and clear. Ideally, all reports should attempt to answer the original clinical question. This seems a simple requirement and yet it is not always as easy as it sounds. In this paper, we explore the importance of the report, reasons that give rise to poor report writing and suggest educational resources that are available to improve poor report writing. Common mistakes and language ambiguity are discussed. Finally, we suggest a simple five-point framework, which practitioners may find useful when constructing ultrasound reports.

Keywords: Language, communication, medicolegal, audit, research

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Introduction

This paper seeks to identify the common features which influence the quality of an ultrasound report and offers guidance on basic report writing. Although there is agreement around some of the elements necessary for a satisfactory radiological report, there is an absence of consensus over what constitutes a good report.[1] Imaging practitioners disagree on what should or should not be included. Similarly, referrers lack concordance on what they wish to receive.

There is no single 'correct' way to report, but important elements include a concise, logical structure, clarity, accuracy and an attempt to answer the clinical question, with differential diagnoses if appropriate, and suggestions for further management.

The conveying of medical and scientific information requires a particular style, which can be learnt. Standardisation improves clarification, makes data retrieval from reports easier and so facilitates audit and research. Based on current evidence, we consider key elements in an ultrasound report, suggest useful tips as well as common pitfalls to be avoided and make recommendations for good reporting that ultrasound practitioners may find helpful.

What is an ultrasound report and who should produce it?

The report is the primary means of communication between the ultrasound department and the referring clinician. It constitutes a clinical opinion and provides a specialist interpretation of images.[2] It should be accurate and inform patient management.[3]

Reports comprise part of the permanent record held in the patient's notes and thus are of medicolegal importance as well as essential for influencing patient management. The accuracy of a written radiological report is crucial, but perhaps even more so in ultrasound, because the images provided are only representative of, and usually vastly inferior to, the dynamic scan obtained at the time of the examination. This is why in the United Kingdom (UK) it is recommended that the person performing the scan also produces the report.[4]

Referring clinicians rely on the report rather than the images, and therefore, every care should be taken to optimise the report. Stored images are necessary, however, to provide a valuable back-up for the report, which allows discussion and teaching to take place around difficult cases. Stored images also demonstrate the technique and settings used at the time of the examination, which may be used as evidence in medicolegal cases. In addition, stored images are helpful to refer to for comparison at follow-up appointments.

What makes a good report framework?

Some professional organisations offer useful tips and guidance on how to structure a report,[2,3] whilst others have gone as far as producing detailed sample reports.[5–7] The American College of Radiology has developed BI-RADS, a standard way of describing mammographic findings.[5] The Radiological Society of North America has taken this idea further by developing a vast number of example report templates; its radiology reporting initiative aims to improve

reporting practices by 'creating a library of clear and consistent report templates'.[6] The USA-based SonoNet offers something similar, specifically for cardiovascular ultrasound.[7] In the UK, the recent Health Education England and College of Radiographers' e-Learning for Healthcare collaboration aimed to improve image interpretation and report writing in ultrasound by offering a series of e-learning interactive sessions, which include many examples of good report phrases.[8]

Perhaps referring clinicians are best placed to say what constitutes a good report, and some have identified preferences in recent studies.[9,10] Evidence indicates that most clinicians, including general practitioners (GPs), prefer tabulated or itemised reports. They like brevity but not to the extent where 'normal' is all that is written; referrers like to know what has been examined and what has not. A list of organs/areas followed by 'normal' (or not) is perfectly acceptable. Furthermore, GPs do not like to be burdened with measurements, since most do not know the normal size range of organs.[9]

Conclusions or impressions are preferred by an overwhelming 92%, [9,10] but many clinicians complain that the conclusion does not address the clinical question.[11] Arguably, it is good practice to write every conclusion as a direct response to the original clinical question where possible. It reassures the clinician that the request has been read, aids patient management and focuses the thoughts of the ultrasound practitioner. A negative aspect is that some clinicians may read only the conclusion.[3]

Report templates can be designed locally in collaboration with referring clinicians to ensure that the required information is given consistently and in a clear and concise manner. Using a consistent framework for the report allows audit to take place and ensures that reports meet the locally required standard.[12,13]

Constructing and writing the report

When constructing the report it is preferable to write in the present tense.[1] Coakley *et al*.[14] emphasise the need at all times for brevity, clarity and pertinence. Keep sentences short and accurate. For example, epididymides is the plural of epididymis, not epididymi.

Avoid repetition, tautology and superfluous words. Phrases such as 'total occlusion' are pointless. Thrombus is either occlusive or non-occlusive. The length of a report is often inversely proportional to the confidence of the report writer, as noted by Hall.[1]

Elements which might usefully be included are summarised in Table 1. The *Clinical History* should normally match that on the request. The *Area Examined* will describe the region investigated and should also include any relevant technical details, for example '*transvaginal assessment with patient consent*', or '*contrast enhanced US*' – including the dose, the fact that there are no contraindications, verbal consent and any reactions observed. The term '*difficult scan*' should be avoided. If the scan was technically difficult, but all the information required was obtained, then the comment is pointless. If, however, technical limitations prevented areas or organs from being examined properly, then specific comments to that effect should be made in the report, for example, indicating a low exclusion value or non-visualisation of a relevant structure. The *Description of Findings* should be brief, concise and accurate. It is rarely useful for the clinician to receive acoustic descriptions, which may be poorly understood at best and in which important information may be buried. Information which is irrelevant to the conclusion should be avoided. For example, '*The liver is hyperechoic and attenuating*' is often meaningless to the recipient of the report. It adds nothing to the simple and more useful statement, '*Fatty liver*'. Similarly, '*The bile duct measures 6 mm in diameter*' is unhelpful. '*Normal calibre bile duct*' is better. Acoustic descriptions of the ovary detailing physiological features such as dominant follicles are often superfluous (apart from within the context of IVF treatment). Better to just put '*Normal appearances of both ovaries*'. The *Interpretation of Findings* should take into account previous imaging/diagnostic tests as well as the clinical history, for example, '*This nodule has appeared in the liver since the last ultrasound scan of December 2013 and is suspicious for a hepatocellular carcinoma*'. The *Conclusion* should be brief, aim to answer the clinical question and offer recommendations if appropriate.

Table 1 Suggested order for an ultrasound report

Clinical history
Area examined
Description of findings
Interpretation of findings
Conclusion

Ideally, the report will offer a diagnosis to account for the symptoms. In cases where this is not possible, offering many differential diagnoses is unhelpful.[3] It is better to provide just one or two, otherwise the examination loses value. Caveats are also frequently unhelpful. They may be seen as reflecting a lack of experience by the operator and/or an attempt to avoid any medicolegal consequences attached to an incorrect diagnosis. For example, phrases like '*ectopic pregnancy cannot be excluded*' should be avoided since, arguably, no radiological report can exclude anything. Better to say '*No evidence of intra- or extrauterine pregnancy. If the pregnancy test remains positive, this is a pregnancy of unknown location*'.

Perhaps for similar reasons, some ultrasound practitioners favour writing descriptive reports only, which are often of less value to referring clinicians. Based on recommendations from the joint publication by the Royal College of Radiologists and Society and College of Radiographers,[15] and considering the nature of ultrasound and its significant role within today's modern healthcare arena, it is difficult to justify only descriptive reports.

Terminology

Technical jargon should generally be avoided. Words such as 'echogenic', for example, are meaningless; most structures are echogenic (i.e. they generate echoes). Terms which ultrasound practitioners take for granted are a

source of confusion to some GPs and referring clinicians.[16] However, lay language is equally unacceptable for a formal medicolegal document, so words like 'bright' or 'shadow' or 'blood clot' are best avoided.

The language used should reflect what has been examined. If the common hepatic duct has been measured, it is wise not to call it the common bile duct. The term 'common duct' is more useful, as ultrasound may not be able to distinguish between the two. Confusion exists over which is the 'proximal' and which the 'distal' end of the duct[17] and referring to the 'lower end' or 'intrahepatic portion' of the duct is usually clearer to the referring clinician.

Other areas of potential pitfall include reporting of deep vein thrombosis (DVT). Describing the 'superficial femoral vein' in a report introduces risk and has for some time.[18] Sixteen years on and 75% of clinicians still think it is part of the superficial venous system[19] and would therefore not administer anticoagulation in the presence of thrombus. Whilst this terminology is technically correct, many departments now favour the term 'femoral vein' to avoid this problem. Furthermore, the presence of a DVT should be emphasised in the conclusion.

Describing a dominant follicle in the ovary as a 'cyst' may often be the source of needless repeat scans and patient anxiety. If the ovary has normal physiological features, it should be called normal. The term 'cyst' is often understood to imply a pathological finding by referring clinicians.

Equivocal words like 'slightly' in the report are unhelpful to clinicians as the significance is often unclear. Whether referring to the size of the spleen, the echogenicity of the liver or the volume of amniotic fluid, a confident practitioner should be able to say whether something definitely is or is not there. If the appearance is so mild that you are having difficulty convincing yourself, you should not try to sway others, who may be forced to act on your indecisiveness by subjecting the patient to potentially unnecessary further testing and imaging procedures.

Communicating the report

Findings which need to be acted upon urgently should be communicated urgently.

It is often an assumption on the part of the ultrasound practitioner that the clinician who has requested the examination will automatically receive and act on the results. However, it is advisable in cases of unexpected findings, especially those which are likely to be malignant or acutely life-threatening, for the practitioner to ensure that the report is communicated promptly to the referrer and acknowledged. An addendum to the report stating that the report has already been faxed or telephoned to the clinician is useful.

The future

The issuing of standardised reports is likely to increase in the near future. Ultrasound reports contain information that can facilitate audit, teaching and research if these data were easily extractable.[3,11] Use of multiple synonyms and differing styles make it much harder to retrieve details using manual or automatic systems, and so standardised reporting would minimise this problem as well as reduce confusion amongst referring clinicians. A standardised vocabulary is attractive to both clinicians and patients.[11]

Conclusion

The ideal report is subject to the variable needs of the patients, the service providing the scan and the referring clinician. Personal preference plays a part, and it is not necessarily appropriate to suppress the practitioner's option to communicate as he/she sees fit. By following a logical structure and adhering to simple guidelines, practitioners are more likely to communicate valuable information in an effective and efficient manner. This is important not just for patient management but for retaining services in an increasingly competitive market. Use of standard report templates is likely to further minimise confusion and errors. These in turn will aid auditing procedures, which will identify further areas for improvement and refinement.

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