The Impact of Bedside Ultrasound on care in Specialist Palliative Care Units – A Qualitative Study

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ABSTRACT

Context

Ultrasound is widely used within hospitals. Little is known about how ultrasound is used for palliative care patients, particularly in specialist palliative care units (SPCUs).

Objectives

To explore the experiences of palliative care doctors regarding the clinical impact of ultrasound in SPCUs.

Methods

The study adopted a qualitative research design using semi-structured interviews and a reflexivity journal. Six participants were recruited through purposive and snowball sampling. Findings were analysed using framework analysis.

Results

Analysis used four predetermined themes: (1) practicalities, (2) clinical indications, (3) impact on patient care and service provision, (4) governance and training. Analysis identified a relationship between procedural confidence and use of ultrasound.

Conclusions

Our study provides information for understanding the current use and limitations of ultrasound in SPCUs. Ultrasound leads to safer practice, especially when performing invasive procedures such as paracentesis. Development of standards around the use of, and training of staff undertaking ultrasound in specialist palliative care, are recommended.

Key messages

What was already known?

- Ultrasound is used widely within hospitals to inform diagnoses and improve procedural safety.
- Little is known about how ultrasound is used for patients with palliative care needs, particularly in SPCUs.

What are the new findings?

- Ultrasound is valued by palliative care clinicians.
- While ascites management is a common reason for ultrasound use, there is variation in other uses.
- Clinician confidence is an important reason for this variation.

What is their significance? How this study might affect research, practice or policy – *summarise the implications of this study*

- These findings may help those who currently do not use ultrasound, or are considering expanding its use in their practice.
- It emphasises the need for governance and the development of training and standards around the use of ultrasound in specialist palliative care.

INTRODUCTION

Ultrasound is widely used within acute hospitals for diagnostic and procedural purposes. The technology has become cheaper and more portable, increasing the frequency of its use and expanding its application in terms of clinical location, operator background and diagnostic and procedural scope [1].

Ascites and pleural effusions are common complications of cancer seen by palliative care specialists where drainage provides effective alleviation of symptoms. The use of ultrasound in diagnosis and performing drainage procedures is considered ‘best practice’ because of improved success rates and reduced complications [2,3].

Preliminary studies suggest that a paracentesis or pleural drainage service provided by SPCUs, underpinned by the use of ultrasound, can provide favourable patient experiences. However, these studies are limited by small patient numbers and the wider impact on service provision, training and governance is poorly understood. [4, 5].

Despite these reported benefits, research conducted by our group showed that 38% of respondents from SPCUs across the UK did not have an ultrasound scanner available onsite [6]. Twenty-seven percent of respondents had not performed paracentesis in the last year. Reasons for this included not having access to an ultrasound scanner and lack of experience.

Other indications for the use of ultrasound relevant to palliative care include the identification of urinary retention, bowel obstruction, hydronephrosis, hepatomegaly, musculoskeletal conditions such as capsulitis and osteomyelitis, and venous thromboembolism [7]. The extent to which ultrasound is used for these indications and the perceived impact this has on care in SPCUs is poorly understood.

The aim of this study was to explore the views and experiences of palliative care specialists using ultrasound in SPCUs providing insight into the extent of, and barriers to its use, the wider implications on service provision and how training and governance are approached.

METHODS

The study adopted a qualitative research design using semi-structured interviews and a reflexivity journal as methods of data collection. These methods were used to collect narrative data which enabled exploration of participants’ views and experiences [8].

Doctors working in SPCUs who perform ultrasound as part of their clinical management were recruited. In SPCUs where more than one potential participant was

identified, the participant with the most experience in using ultrasound was interviewed.

Participants were identified through purposive sampling This involved contacting doctors who had previously volunteered when participating in an online survey about ascites management [6], and doctors who were known to have completed a Focused Abdominal Ultrasound in Palliative Care (FASP) course. These sampling methods identified a limited number of participants, so snowball sampling was also used to recruit more participants. Six participants consented to participate.

Participants received a participant information leaflet and consent form to review. An opportunity to discuss the study was provided and, prior to interview, written consent was obtained. Interviews took place virtually using Zoom and an audio recording of the interview was created. All interviews were undertaken by the same individual (SM) and data were stored securely on a password protected NHS networked computer. A topic guide (Appendix 1) was used to provide structure for the interview. The themes in this topic guide originated from analysis of previous literature [4-6], the research undertaken by this research group, and discussion between investigators. A reflexivity journal was written immediately after each interview to reflect on the data, their relationship to the themes identified, and personal views. Items written in the journal were also used to inform data analysis. All interviews were anonymised, transcribed, and then re-listened to for errors of transcription to ensure accuracy (SM, PP).

Findings were analysed using framework analysis [9]. A framework was developed from a-priori themes informing the topic guide and emerging themes from the interviews. Three individuals (SM, BS, PP) independently developed themes which were then discussed and agreed to enhance rigour.

RESULTS

Six participants were interviewed. The interview data were analysed using the four themes: (1) Practicalities, (2) Clinical indications, (3) Impact on patient care and service provision, and (4) Governance and training. Each theme is discussed below with illustrative quotations.

(1) Practicalities

All participants had access to a portable ultrasound machine facilitating scans and procedures in SPCUs, patients' homes and care homes. Participants found that there were no issues with accessibility of ultrasound machines.
Frequency of ultrasound use varied from less than once a month to several times a week. Two participants reported that the frequency had been increasing, although the COVID pandemic had a negative impact on its use.

All participants mentioned scanners' portable nature and the ability to perform scans at patients' bedsides, both in the community and in SPCUs:

“"The ward doctors will just grab the whole trolley and push it to any patient they want to see or the community doctors will just dismount it from the stand and put it in a case and take it out.” (P5)

Most participants reported having two ultrasound machines. One participant commented that ultrasound machines were expensive which may be a barrier to use.

(2) Clinical Indications

Clinical indications were in two broad categories:
Aiding diagnosis
Aiding procedures

Aiding diagnosis

The most common use of ultrasound reported by most participants was confirming the presence of ascites. One participant reported its use in the diagnosis of urinary retention as being the most common use. All but one participant also used it for the diagnosis of pleural effusion.

Whilst many had been trained to diagnose deep vein thrombosis, a lack of confidence was expressed in diagnostic ability and, as a result, confirmatory scans were requested in hospital.

“We have used it to look for DVTs. I don’t think we do it very successfully, but we look.” (P6)

Some participants used ultrasound more broadly as a diagnostic tool for both abdominal and chest pathology when there was diagnostic uncertainty.

“And I think I do use it as a diagnostic tool. Not just when I suspect ascites but sometimes when I don’t know what’s going on.....you know there is a mixture of constipation, tumour, ascites, hepatomegaly and we’re not sure what’s going on in the abdomen and I have found it quite useful sometimes.” (P1)

“To put on the ultrasound and show that she had a marked hepatomegaly but no intrahepatic biliary duct dilatation so that there was no possibility of an extra-corporeal stent or drain.” (P2)

“I think it really helps well when there is uncertainty as to how much this abdominal distension is down to fluid but how much could be down to tumour bulk or constipation.” (P3)

Aiding procedures

All participants used ultrasound to safely perform paracentesis and felt comfortable and confident to do so. There was consensus that performing paracentesis at home is not ideal, but it could be done.

There was less agreement with regard to performing pleural aspiration within the SPCU. Only two participants said that they would perform pleural aspiration in the

SPCU whereas the rest would not because of the perceived need for monitoring and x-rays. Consequently, these patients would be transferred out of the SPCU with a feeling that patient care was negatively impacted.

> *"I would love to be able to use the ultrasound probe for supporting the use of chest drains in the small number of patients that are really breathless and approaching the end of life. It seems very cruel to have to transfer them out of a Hospice."* (P2)

Half of participants also used ultrasound as an aid for vascular access. This was a skill developed in hospital before moving to working in SPCUs.

One participant used ultrasound to aid suprapubic catheterization and discussed how visiting anesthetists had used ultrasound to perform nerve blocks.

(3) Impact on patient care and service provision

All participants' experience was that the availability of bedside ultrasound as good for patient care.

> *"I think if I was to go and work somewhere we didn't offer this or we didn't do it, I think I would see it as a real disadvantage."* (P3)

Its use improved clinical decision making and led to the avoidance of unnecessary procedures such as cannulation attempts and urinary catheters if it could be shown that patients were not in retention.

> *"It improves access to a little bit more information to help improve the quality of decision making, which can be really significant in those last crucial days, weeks and months of life by providing more patient focussed treatments and responding to situations."* (P2)

All participants reported that the use of ultrasound led to better patient safety and no participants reported any significant complications.

One described how an ultrasound scan could lead to new conversations. Patients coming to SPCUs for procedures could act as an introduction to the palliative care service and an opportunity to provide a holistic assessment.

> *"There are lots of patients who have come to us for a procedure because it is part of their palliative care needs, not for any other reason. That it is more appropriate to do it in a situation where they get a holistic assessment of their needs rather than just an assessment of their ascites."* (P6)

Participants described how the availability of ultrasound in their SPCU created a more efficient service for patients and avoided unnecessary hospital admissions, also helping to reduce pressure on hospital services. All wider services and

colleagues were receptive to the use of ultrasound and participants did not feel that it had significant impact on the demographics of patient attending the SPCU.

> *"The fact that I can see them at home if needs be and get them into the SPCU within a couple of days to have it done as opposed to being seen by one of our team, being referred for an ultrasound, going home and then having to go into hospital. I think they get a much more streamlined service."* (P1)

Some participants explained that, on occasion, an unexpected finding might be identified during use of the ultrasound and, consequently, more complex unprepared discussions had to take place, which was seen as problematic.

Additionally, some participants experienced the need to coordinate admission on specific days of the week relating to availability of the doctor with ultrasonographic skills. There was also a reported misunderstanding that some staff members do not always understand the limitations of the ultrasonography.

> *"Other colleagues promise patients that we can do an ultrasound scan, however we usually do a clinical examination first, assessing tumour mass. Despite our clinical findings, we feel obliged that our team member has promised a scan."* (P5)

(4) Governance and Training

Most participants confirmed that their SPCU had a local protocol of how to perform procedures. Specifically, regarding paracentesis, this included pre-procedure blood tests, human albumin solution delivered to an SPCU and post-procedure monitoring. Regarding consent for paracentesis, some respondents used verbal consent under certain circumstances, for example, if it was likely to be a straightforward procedure. Others insisted on written consent. Most talked about recording in SPCU and personal logs, and self-auditing procedures whilst one respondent did not keep a logbook. If using ultrasound for diagnostic purposes, some participants mentioned that they would explain what they are and are not able to diagnose before using the ultrasound.

Most participants have undertaken various combinations of short courses, for example; FASP or Focused Assessment with Sonography in Trauma (FAST), pleural ultrasound training and local training with radiologists. After the initial short course, participants reported a challenge to find ongoing experience and training with much of it being ad hoc from radiology departments, YouTube, and other doctors.

> *"The difficulty we had was getting some more experience with someone with us so as far as anyone was concerned, you could then scan people really but still you are quite inexperienced."* (P1)

Most participants expressed a lack of confidence as a barrier to using ultrasound more widely. Some felt that all palliative medicine specialists should be trained in its use

whilst others thought it should not be mandatory as some specialists, such as those who are hospital-based, would not benefit. Additionally, some felt that it should not replace other essential parts of an already full curriculum.

Despite the perceived benefits and little concern of complications, some participants expressed that undertaking ultrasound guided procedures was becoming less common within the specialty due to a lack of confidence of clinicians and procedures being performed by other specialists.

> *"I would be worried about the loss of procedural interventions within Palliative Care."* (P2)
>
> - *"…this [ultrasound] should be, you know, part of palliative medicine training for the future."* (P3)
>
> *"it is going to be the stethoscope of the new world. So they ought to be able to use it, I think."* (P6)
>
> "*Whether it [Ultrasound] would be a useful enough skill to displace other things from the training, I don't know really."* (P4)

DISCUSSION

Ultrasound has become an increasingly popular diagnostic and therapeutic modality due to its low cost, portability and safety [1]. The participants in this study found ultrasound beneficial, aiding diagnoses, and making procedures safer, improving patient experience.

We found variation in how ultrasound is used including which procedures and differences in documenting informed consent. With regards to pleural aspiration, the perceived need for x-rays and monitoring were also influential. Whether a clinician performed a particular procedure or not related to their confidence. It has been shown that procedural confidence is of intrinsic importance through influence on the practitioner's willingness to undertake procedures, accurate self-assessment of their skills, and willingness to ask for support [10]. Procedural confidence also independently affects performance and is an important target for maintaining competency [11].

Currently paracentesis is included in the palliative care specialist registrar training curriculum [12], but ultrasound skills are not. The Royal College of Radiologists (RCR) suggest that use of ultrasound by medical non-radiologists should be incorporated into a robust programme of continuous training, supervision, regulation and continuing professional development to provide a safe and diagnostic ultrasound service [13]. There are no current guidelines for training or governance in ultrasonography in palliative care, however local centres have created their own policies for invasive procedures. Use of logbooks can help clarify learning objectives and a minimum standard of training, enabling consistent quality and educational standards. They can

be used for audit and governance, which could include equipment maintenance. No participant discussed quality assurance of the machine and whether this is something they invest in, despite RCR recommendations that this be an essential aspect of integrating ultrasound within clinical practice [13].

Bedside ultrasonography in palliative care can provide a more streamlined service for patients. Whilst hospital admissions can play an important role in diagnostic services and improving symptoms, it has been found that patients at the end of their lives are often admitted to hospital with little or no benefit [14], which can be distressing for patients and families. Use of imaging within an SPCU during the end-of-life period could contribute to decision making that impacts overall healthcare utilisation, reduce hospital cost and minimise interruption to patient care without the need for movement to another setting [15].

Limitations

Whilst the sample size of six participants may be considered a limitation, the use of semi-structured interviews enabled in-depth exploration of the experiences and recommendations from these participants who use ultrasound routinely in their practice and have undertaken relevant training. All participants are based in the UK and, therefore, their experiences are most relevant to the development of ultrasound practice in SPCUs in this country. Expanding the study could be achieved by interviewing palliative care specialists from SPCUs in other countries, whilst giving consideration of differing service delivery and governance.

Framework analysis with pre-determined themes regarding use of ultrasound in palliative care relied on the team's understanding and experience of the subject area. This may have led to bias in the themes identified. However, data analysis did not identify any additional areas for inclusion to guide the development of safe ultrasound practice in SPCU.

There was a degree of selection bias as interviewees recruited had attended the FASP ultrasound training course, increasing the likelihood of engagement in a study on ultrasonography in palliative care. This purposive sampling approach may be open to individual bias but it was felt due to the lack of previous studies on this topic, context specific expert judgement was deemed the most appropriate way to explore current ultrasound use and the experiences and perceptions of those undertaking this.

Further research, consulting UK based and international SPCUs on their use of ultrasound is merited. Opportunities to audit include length of admissions comparing SPCUs that perform ultrasound to those that do not.

CONCLUSION

This qualitative research yields information for understanding the current use and limitations of using ultrasound in SPCUs. The findings reinforce that it is a non-invasive, well tolerated investigation that can be performed in SPCUs or patients' homes to aid clinical diagnosis and management. This can enhance patient experience, quality of life and symptom management, which is the holistic approach palliative care strives for.

The findings will be helpful to those who currently do not use ultrasound and are considering introducing use in their practice and service to inform governance processes and ensure patient safety. The findings may also inform discussion about the inclusion of ultrasound into the palliative care curriculum where inclusion could provide a standard for training and practice for procedures which can be safely performed in SPCUs, alongside revalidation requirements. This could ensure standards of ultrasound used across SPCUs and optimise patient care.

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APPENDIX 1

(1) Topic Guide and Themes

When did you do palliative care training and when did you become a consultant?

Ultrasound – Can you give me an idea of how you use ultrasound in your day-to-day practice?
What are the practicalities of using it? For example, is it portable or used in a specific room?
Is ultrasound performed in the community. For example, in a patient's home?
Frequency of use?
What procedures do you perform with it?
Are their procedures that it could be used for that you don't do and if so why?
Any difficulties with availability?
Do you use sterile ultrasound gel?

Your practice – How has the arrival of bedside ultrasound changed your practice?
Do you think you have become more likely to offer an intervention that you would not have offered before?
How did you manage before? Any examples of benefit?
Any occasions where you regretted using it? (Either complications or adverse patient expectations)
How do you deal with complications (re-admit to hospital, admit to hospice)
Do you have a dedicated policy for use of imaging and particularly for dealing with complications because of procedures?
Have you found any resistance from other colleagues (either at your centre or in the local area) in the use of imaging in your practice?
Have referrals to your centre changed (number, type) with the availability of imaging?
Do you think your service has had any impact on admissions to hospitals?
Do you actively promote the availability of imaging at your centre to commissioning bodies, GPs, hospitals?

Consent – how do you discuss this procedure with patients prior to procedures?
Do you specifically discuss plans in case of complications e.g. bleeding?
Do you routinely perform investigations before or after a procedure?
Theoretically, if you were to cause a serious complication through an invasive procedure (for example bleeding after draining a pleural effusion), how would you approach the situation?
Do you obtain written consent? Do you use patient information leaflets?

Training – can you explain about the training you have undertaken to provide ultrasound in your practice?

How is your practice monitored/audited and kept up to date?
How confident do you feel in using imaging to guide therapies and invasive procedures?
What training have you had in use of imaging?
Do you have plans for further training or expansion of the role of imaging in your current practice?
How do you maintain performance/revalidate?
Do you audit your performance with e.g. professional radiologist?
Have you trained other staff in this role (e.g. assisting or independent practitioners)
How do you feel your training experiences differ from your other colleagues?
What are your thoughts towards current palliative care training and ultrasound use.

Any other thoughts or points you would like to discuss?