Developing a nurse-led paracentesis service in an ambulatory care unit

**Abstract**

Ambulatory emergency care units are present in many hospitals and accommodate patients who need urgent medical assessment or procedures but do not require inpatient admission to achieve this. This article reports on a project undertaken in the ambulatory care unit at the Royal United Hospital Bath, which introduced a nurse-led paracentesis service with the intention of reducing waiting times and improving the service for patients. To evaluate the effect of the project, patient satisfaction levels and waiting times were measured before and after the introduction of nurse-led paracentesis. The results confirmed a significant reduction in waiting times after the nurse-led intervention was introduced and high levels of satisfaction. The results provide evidence that nurses are acquiring the knowledge and skills required to undertake interventional procedures that improve the patient’s experience while contributing to pioneering developments in ambulatory emergency care services.

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Ambulatory care, ascites, emergency care, nurse-led services, paracentesis, service improvement

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**Technical note**

AMBULATORY EMERGENCY CARE is an evolving approach in which appropriate patients, including emergency patients, can be diagnosed, treated and discharged from hospital on the same day. It offers healthcare professionals opportunities to develop innovative services that reduce the length of stay in hospital while improving the patient’s experience. Nurse practitioners working in ambulatory emergency care are acquiring the knowledge and skills to manage groups of patients autonomously using clearly defined guidelines and pathways. The NHS Institute for Innovation and Improvement (2012) supports this creative approach, listing a range of emergency conditions in *The Directory of Ambulatory Emergency Care for Adults*, many of which can be managed by nurses.

Abdominal paracentesis or drainage of ascites is increasingly carried out as an outpatient procedure in day case or ambulatory care units. The procedure involves the insertion of a catheter into the peritoneal space to drain excessive accumulated fluid called ascites. It is used for diagnosis, or for therapeutic purposes when the volume of fluid becomes uncomfortable. Approximately 75% of patients presenting with ascites have liver cirrhosis, with the remainder due to malignancy (10%), heart failure (3%), tuberculosis (2%), pancreatitis (1%) and other rare causes (Moore and Aithal 2006).

With the support of therapeutic treatments, patients with cancer are living longer and may require ascitic drainage during diagnosis and ongoing treatment (Cancer Research UK 2011). The number of people with cirrhosis is also increasing. Liver disease is a growing clinical problem and public health priority in the UK. Although death from liver disease is declining in other European populations, death from liver disease and cirrhosis increased in England by around 20% from 2000 to 2009, making it the fifth leading cause of death (Office for National Statistics 2011). Mortality from chronic liver disease in the UK has risen more than 450% from 1970 to 2000 (Academy of Medical Sciences 2004). Moore and Aithal (2006) estimated that...
50% of patients with liver cirrhosis will develop ascites. Although 90% of patients with ascites are treated successfully with sodium restriction and diuretic therapy, 10% may need to attend hospital for drainage of ascites that is resistant to diuretic therapy or for treatment of complications that preclude the use of an effective diuretic dose (Runyon 2004). Consequently, paracentesis is used increasingly as a medical therapy for patients with ascites that is resistant to diuretic therapy and ascites caused by malignancy (Fleming et al 2008). This increasing demand is illustrated in Figure 1, which shows the Bath ambulatory care unit’s experience from 2009 to 2012, with demand for this procedure more than doubling over this period.

Paracentesis as a day case procedure in ambulatory care units has traditionally been carried out by junior doctors, and increasingly at the ambulatory care unit at the Royal United Hospital Bath by medical consultants. An internal satisfaction survey of 47 patients attending the ambulatory care unit was carried out over two months in 2009. The survey confirmed high levels of satisfaction with day case services but also indicated that as patient numbers increased so did waiting times, particularly for paracentesis. Medical staffing constraints made it impossible to guarantee ready availability of the necessary doctors.

Increasingly lengthy waits were the impetus for introducing a nurse-led service to deliver timely treatment for patients undergoing this procedure. Lockhart (2005) described care in the 21st century as based on partnerships depending on flexible teams to develop existing services and change roles to meet patient need. It seemed obvious that team flexibility could be improved by training medical nurse practitioners to perform paracentesis, thereby increasing the number of professionals available to undertake the procedure. It was anticipated that the change would result in a reduction in waiting times and enhancement of the patient’s experience by improving the continuity of care, with one healthcare professional providing treatment and ongoing care to the patient throughout the day. The proposed change also aimed to release time for medical consultants who had been providing the paracentesis service. The pay differentials between the staff concerned meant that nurse-led paracentesis would be more cost-efficient than paracentesis performed by consultants. There was the added benefit of redeploying consultants to other areas where their skills could be used more appropriately in providing clinical care for patients and supporting junior medical staff.

### Literature review

A literature review was undertaken on nurse-led paracentesis, to identify and collect any research or qualitative data that would provide the best available evidence for a change in practice. If there is a lack of research evidence to support a new area of nursing practice, Dempsey and Dempsey (2000) advised considering other valid and relevant sources of evidence, using a combination of clinical expertise and contextual data. Anecdotal evidence from other nurses carrying out paracentesis in an ambulatory care environment was therefore gathered by telephone, email and onsite visits.

There was little relevant research to review relating to nurse-led paracentesis, which probably reflects how recent the practice is. Two American journal articles contain research in the form of retrospective analysis of patients undergoing paracentesis either by a medical physician or nurse practitioner (Grabau et al 2004, Gilani et al 2009), and the authors concluded that paracentesis performed by a nurse can be safe and efficient. Hill (2009) outlined how the day case nurse-led paracentesis service he manages has reduced patients’ length of stay by 80%. Visiting an established nurse-led paracentesis service provided by a neighbouring hospital provided valuable insight into the development and implementation of policy and training, while discussions on practical information and potential pitfalls offered valuable assistance to the project.

The research articles focused on advantages such as less fragmented care, reduced waiting times and benefits for patients. While sparse, the literature...
reports positive results from the introduction of nurse-led paracentesis services. The anecdotal information from other nurses supports this, with new nurse-led services being planned or in the process of being implemented. One such service for management of malignant ascites at the Great Western Hospital in Swindon (Royal College of Nursing 2012) has received excellent feedback from patients and healthcare professionals who access the service for patients.

**Preparing for change**
Managing the process of change is a challenging and highly skilled undertaking. Le May (1999) noted that many practitioners are wary of change and advised that the change process requires careful planning and sensitive handling. Leadership and acting as a change agent are vital to implementing change. Shaw (2007) defined a leader as someone who ‘shares the vision and develops partnerships’. Adair (2007) described leadership as a function that can be learned or improved. Three models or frameworks for implementing change were reviewed to understand better the practical steps of change and improve leadership skills as advised by Adair (2007). The models were:

- The **Promoting Action on Research Implementation in Health Services** framework (Kitson et al 1998).
- **How to Change Practice: Understand, Identify and Overcome Barriers to Change** (National Institute for Health and Care Excellence (NICE) 2007).
- **The Improvement Guide: A Practical Approach to Enhancing Organizational Performance** (Langley et al 2009).

These models identify the phases and processes of implementing evidence-based practice and introducing healthcare change and have been influenced by Lewin’s (1951) change management model.

There are several approaches to introducing change, from ‘letting it happen’ – for example waiting to see if the results of published research are taken up widely – to ‘making it happen’ by using mechanistic strategies such as incentives or even sanctions (Greenhalgh et al 2004). These methods are flawed. The first is insufficiently robust to ensure adoption of practices based on evidence, while the second has the potential to damage relationships and can lead to change resistance. No approach is guaranteed to succeed but it might help to understand that ‘organisational change is a process that can be aided by perceptive and insightful planning and analysis and well crafted, sensitive implementation phases, while acknowledging that it can never be fully isolated from the effects of serendipity, uncertainty and chance’ (Dawson 1996). For this project, no single model was used but the knowledge gained from reviewing the models and guidance increased confidence, and helped the team to develop and structure its objectives and plan practical steps to complete the project.

The change project was planned using a structured framework, details of which are shown in Figure 2. During the project cycle, many of the steps involved were undertaken concurrently.

**Training and development of new clinical skills**
Two medical nurse practitioners were involved in the project and required training to carry out the paracentesis procedure. There is no accredited pathway or course for learning this clinical skill and specific training had to be negotiated and developed. Competency-based approaches to learning clinical skills are prominent in nursing and medical training, with learners demonstrating competency in a skill during a period of assessment. Classroom training using simulation, video, voice file and e-learning techniques are often available for clinical skills training and this can augment clinical practice. These methods expose patients and learners to less risk when developing skills than the traditional method of ‘see one, do one, teach one’ (Lenchus 2010). However, simulation-training techniques were not available for the project.

It was therefore agreed between the lead consultant and the medical nurse practitioners that each trainee would insert ten ascitic drains under direct consultant supervision to demonstrate competency and confidence in carrying out the procedure. Three medical consultants agreed to teach, mentor and supervise during the training period and complete the Direct Observation of Procedural Skills (DOPS) paperwork. DOPS is used by doctors and medical nurse practitioners in the Royal United Hospital Bath NHS Trust to assess competency in clinical procedures. The method of learning the practical aspects of the procedure followed Peyton’s (1998) widely advocated four-stage approach to learning clinical skills in simulated and clinical settings, as outlined below:

- **Step 1**: demonstration of the skill at normal speed with little or no explanation.
- **Step 2**: repetition of the skill with full explanation, encouraging the learner to ask questions.
### FIGURE 2

**Ambulatory care nurse-led paracentesis project timeline from December 2011 to October 2012 at the Royal United Hospital Bath**

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- Nurse-led paracentesis commenced June 2012
Art & science emergency care

Step 3: the demonstrator performs the skill for a third time, with the learner providing the explanation of each step and being questioned on key issues. The demonstrator provides necessary correction. This step may need to be repeated several times until the demonstrator is satisfied that the learner understands the skill fully.

Step 4: the learner carries out the skill under close supervision, describing each step before it is taken.

Since the service was to become increasingly nurse-led, it was important to define the boundaries of professional responsibility and accountability. The Nursing and Midwifery Council (2008) requires that ‘care should be delivered on the best available evidence or best practice’ and that practitioners ‘must have the knowledge and skills for safe and effective practice when working without supervision’. The two medical nurse practitioners learning the procedure had clinical examination skills and regularly performed abdominal examinations as part of their role, and therefore already had the knowledge and experience of how to identify ascites. At the start of any change project or introduction of a new clinical skill it is important to determine that performing it falls within the remit of job descriptions and the wider professional and clinical governance principles.

Ethical and governance considerations

Ethical issues relating to data protection and confidentiality were considered. Patient satisfaction surveys were completed anonymously and after gaining verbal consent. No identifying data were used. Hospital notes were not accessed for the project. The project fell into the category of service evaluation, which did not require research ethics committee review (National Research Ethics Service 2013).

Evaluation

The Department of Health (2009) advises that evaluation helps those involved in a service, including commissioners, managers, practitioners and patients, identify what is working and what is not, and more importantly what can be improved. Evaluation also enables staff to justify the need for service development and to improve patient care.

Before nurse-led paracentesis could be implemented as an intervention, measurement of existing service levels was undertaken to produce evidence to demonstrate the need for change to team members and stakeholders. Patient satisfaction levels (qualitative measures) and measurements of waiting times (quantitative measures) were chosen to assess existing service standards. These methods were used before and after the intervention to evaluate any improvement.

Waiting times

The waiting times from the time a patient arrived at the unit to the time a drain was inserted were collected over four months. Two consecutive months of data were recorded before introducing the nurse-led intervention (during January and February 2012) and two consecutive months of data were collected after the intervention (during August and September 2012). During the intervening period, two medical nurse practitioners were trained and gained sufficient experience to perform paracentesis proficiently.

The patient paracentesis waiting times before and after the nurse-led paracentesis intervention are summarised in Table 1. A significant improvement in reducing waiting times for patients is indicated. Before the introduction of nurse-led paracentesis, more than 60% of patients waited more than an hour, while after the intervention this figure was 13%. After the intervention 87% of patients’ paracentesis started within the hour; previously this figure was as low as 35%. To date, the medical nurse practitioners have conducted more than 100 procedures, with no reported adverse incidents.

Table 1. A significant improvement in reducing waiting times for patients is indicated. Before the introduction of nurse-led paracentesis, more than 60% of patients waited more than an hour, while after the intervention this figure was 13%. After the intervention 87% of patients’ paracentesis started within the hour; previously this figure was as low as 35%. To date, the medical nurse practitioners have conducted more than 100 procedures, with no reported adverse incidents.

Patient satisfaction

All patients who attended for paracentesis during one month pre-intervention (February 2012) and

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<th>TABLE 1</th>
<th>Summary of patient paracentesis waiting times before and after nurse-led paracentesis intervention</th>
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<td>Sample size</td>
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one month post-intervention (August 2012) were asked to complete a confidential and anonymous questionnaire before leaving the unit.

All respondents were asked the same questions. The numbers of patients involved were too small to be statistically significant (17 respondents pre-intervention and 24 respondents post-intervention), therefore a lengthy account of the questions and detailed analysis of the answers to them are not included. However, examples of the type of question asked are provided as well as a summary of the analysis of the answers received.

Question 1 aimed to establish the information with which a patient might have been provided before attending the ambulatory care unit. The remainder of the questionnaire aimed to establish the quality of the service provided by asking questions such as:

- Did the people who carried out your care or treatment introduce themselves?
- Did the person you saw for your treatment explain what would happen in a way you could understand?
- Were you given written information about having an ascitic drain before the procedure?

Other questions covered issues such as satisfaction with the length of wait for treatment, whether there was a preference for treatment by a nurse or doctor, and how satisfied the patient was with treatment. A summary of the results is provided Box 1.

**Implementing and sustaining change**

During the implementation period, it was important to promote the potential benefits of the proposed change to nursing staff, doctors and other professionals who might refer patients to the service. The positive outcome of the change has assisted the acceptance and sustainability of the change. It is important to ask whether this change can be sustained in the long term. NICE (2007) addressed sustainability, advising that changes to a service are incorporated into local policies and written documentation. Policies and procedures were included in the practical steps used by the project team to implement and sustain the change.

The steps taken were to:

- Identify key people to be involved in the implementation. This included patients to ensure that the change and its implementation were relevant to their needs.
- Deliver teaching sessions to ward staff introducing the change and gaining support.
- Produce documentation in the form of a protocol and procedure for medical nurse practitioner paracentesis, which were made available via the hospital intranet.

**BOX 1**

**Summary of patient satisfaction evaluation results**

- For questions aimed at revealing the performance of ambulatory care, the unit scored highly before and after the intervention, with scores typically around 90% or more. Scores were marginally higher after the intervention.
- The majority of patients were satisfied with the length of their wait: 88% before the intervention rising to 100% after the intervention.
- More than 90% of respondents were open to the idea that a doctor or nurse could undertake paracentesis.
- Respondents were very satisfied with the way the procedure had been performed (95 satisfaction score from possible 100 maximum) both before and after the intervention.

**References**


Publish an article about a patient’s experience of the new service in the hospital magazine to raise awareness of the change throughout the trust. Feedback from colleagues and patients was positive.

Add to the evidence base for nurse-led paracentesis by submitting results of the project to a peer-reviewed professional journal.

Share results with the NHS Institute for Innovation and Improvement’s ambulatory emergency care network.

Continue to collect data as part of the daily routine for ongoing audit of ambulatory care services.

Implementing change and developing new services require effective leadership and an understanding of the complexities and problems that might be encountered during the implementation of any new service or improvement. Two factors critical to the success of the project were identified during the post-implementation review:

- The extensive discussion of the proposed change with patients, peers and trust management promoted the change, reduced resistance to it and identified potential problems at the earliest opportunity.
- Using a structured framework (Figure 2) to develop a project plan identified the necessary steps and components to optimise the success and ease of implementing the change.

Communicating effectively with all those involved in the scheme and having a structured plan are factors that will influence the success of any change in clinical practice. Developing a practical project framework such as was used in this project is applicable to developing any new nurse-led innovation in ambulatory emergency care services.

Conclusion

The outcome of this project supports and adds to the limited evidence available, which indicates that nurse practitioners can provide safe and effective paracentesis. Since medical nurse practitioners have been performing the procedure in the ambulatory care unit, there has been a major reduction in the waiting times experienced by patients. Before the intervention, the average wait was 100 minutes; it is now 44 minutes, saving the average patient almost an hour of waiting.

The majority of patients are now dealt with within an hour, whereas previously the majority experienced lengthy waiting times. Providing prompt treatment should be a particular focus when developing services for ambulatory emergency care, as rapid assessment and treatment enables increasing numbers of patients to go home the same day. The results of the project confirm that nurse-led paracentesis can be provided effectively and safely in an ambulatory care unit. If adopted by healthcare organisations, this type of approach to service provision has the potential to enhance teamwork, improve the patient experience and reduce healthcare costs NS.

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Royal College of Nursing (2012) Case Study: Great Western Hospital’s Nurse-Led Day Case Paracentesis Service. tinyurl.com/kd18en5 (Last accessed: September 4 2013.)
