Paracentesis for Malignant Ascites Procedure

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| Author/reviewer: (this version) | Dr Anne-marie Carey - Consultant Palliative Medicine  
Lesley Barnett - Lead Cancer Nurse |
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<tbody>
<tr>
<td>Date written/revised:</td>
<td>November 2012</td>
</tr>
<tr>
<td>Approved by:</td>
<td>Patient Safety Review Group</td>
</tr>
<tr>
<td>Date of approval:</td>
<td>Feb 1st 2013</td>
</tr>
<tr>
<td>Date issued:</td>
<td>11 February 2013</td>
</tr>
<tr>
<td>Next review date:</td>
<td>November 2015</td>
</tr>
<tr>
<td>Target audience:</td>
<td>Clinical Staff</td>
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## Amendment Form

Please record brief details of the changes made alongside the next version number. If the procedural document has been reviewed **without change**, this information will still need to be recorded although the version number will remain the same.

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Brief Summary of Changes</th>
<th>Author</th>
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<tr>
<td>Version 1</td>
<td>November 2012</td>
<td>This is a new procedural document, please read in full.</td>
<td>Dr Anne-marie Carey and Lesley Barnett</td>
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1. INTRODUCTION

1.1. **Ascites**: is an accumulation of fluid within the peritoneal cavity of the abdomen and can occur in association with many conditions such as cancer, cirrhosis of the liver, congestive cardiac failure, and protein depletion\(^1\).

1.2. **Paracentesis**: is the procedure of removing ascitic fluid from the abdominal cavity. The commonest causes of malignant ascites are primary tumours of breast, colon, ovary, stomach, pancreas and bronchus. Paracentesis is a simple procedure, which can be performed as a day case (usually only removing 2-4 litres maximum), occasionally if clinically indicated in patients own home (small volume paracentesis) or as an inpatient. In tense ascites there may be up to 12 litres of ascites present. Removal of 4–6 litres is usually enough for to give symptomatic relief. Removal of more than 4-6 litres increases the risk of hypovolemia and adverse effects, but may give symptom relief for longer until the ascites re-accumulates.

1.3. **Symptoms**: of ascites can be distressing and include abdominal distension, abdominal pain, nausea, vomiting, early satiety, anorexia, lower body oedema and breathlessness.

1.4. **Benefits**: Paracentesis aims to improve the symptoms of ascites. It can improve symptoms in up to 90% of cases, with some benefit seen after just two hours of drainage, although it may take breathlessness 72 hours to improve.\(^7\) It is less likely to improve the associated symptoms of oedema, fatigue, poor mobility and malaise.

1.5. **Risks**: The removal of large volumes (> 6 litres), particularly in patients with renal or hepatic impairment, can cause a fluid shift with hypotension leading to symptoms of dizziness, fatigue and malaise (affects up to 3%). There is a risk of perforation of an abdominal viscus, haemorrhage (1-2%, a particular risk if the INR is raised or the platelets are low), infection and pulmonary embolus from a dislodged thrombus.

1.6. **Prognosis**: It should be remembered that with the exception of chemotherapy-sensitive carcinoma of the ovary, the prognosis in patients with ascites is usually poor (2-3 months). In those very near the end of life, there may be safer ways to control symptoms. Therefore, the guiding principle for management of malignant ascites should be aimed at relieving symptoms, should not add to the patients’ burden and should be minimally invasive.

2. PURPOSE AND SCOPE

The guidelines aim, using the best evidence available, to base treatment on patient reported symptoms, reduce time for the procedure as an inpatient, and reduce unnecessary risk, tests and intravenous fluid treatment.
3. **DUTIES AND RESPONSIBILITIES**

3.1 The overall responsibility for the organisation lies with The Chief Executive of DBH NHS Foundation Trust. However, all nursing and medical staff are accountable for their own actions and omissions and must apply their knowledge and skills at all times in any given situation.

3.2 Registered nurses and doctors have a responsibility to keep their knowledge and skills up to date in order to maintain their required competencies. Report near-misses, clinical incidents and any serious incidents in relationship to a paracentesis procedure (as per NMC and GMC guidance).

3.3 The Managing Director of Doncaster Community Integrated service is responsible for ensuring that systems and processes are in place.

4. **PROCEDURE - PARACENTESIS**

For most patients, paracentesis is the treatment of choice and relieves symptoms in up to 90% patients. For some patients diuretics and other treatment modalities have a place in controlling rate of reaccumulation of ascites.

Paracentesis may not be appropriate if the prognosis is very short and the patient is rapidly deteriorating. If the prognosis is very short but patient has troublesome symptoms, a brief paracentesis of 1-2 litres can be considered to reduce discomfort. Ideally the patient should be admitted as an inpatient for the first procedure. Uncomplicated follow up procedures may be arranged as a day case and in some situations, e.g. for symptom relief in terminal care, paracentesis can be carried out in the home setting.

4.1 **Type of ascites:**

Ascites is usually either a transudate (protein level less than 30 g/l in ascitic fluid) or an exudate (protein level greater than 30 g/l). Transudates are usually seen in those with liver failure, from cirrhosis or metastases (and resulting portal hypertension). A trial of diuretics may be appropriate if the renal function permits. Exudates are seen usually with intra-abdominal malignancy, and diuretics are unlikely to be helpful.

If there is uncertainty regarding the type of ascites and whether diuretics may help, a serum ascites albumin gradient (SAAG) can be taken. This is performed by sending a specimen of ascitic fluid to the biochemistry laboratory for measurement of protein and albumin levels. This albumin level is subtracted from the serum level and if the value is greater than 11 g/l, a trial of diuretics may be helpful post drainage to slow the rate of reaccumulations.³

4.2 **Indications for procedure:**

- Pain, discomfort or tightness due to stretching of the abdominal wall.
• Dyspnoea, usually exacerbated by exertion, due to upward pressure on the diaphragm.
• Nausea, vomiting and dyspepsia due to ‘squashed stomach syndrome’.
• Patients are usually symptomatic only when the abdominal wall is tensely distended.

4.3 Contraindications to paracentesis

• Local or systemic infection
• Low white cell count / neutropenia
• Coagulopathy: platelets < 40×10^9/L or INR > 1.4
• Limit paracentesis to 4-6 litres maximum if:
  o Hepatic or renal failure (creatinine >250mmol/L)
  o Albumin < 30g/L or sodium < 125mmol/L

4.4 Complications of paracentesis

• After a large volume paracentesis (usually > 6 litres), the compensatory large-fluid shifts from circulating volume into extracellular fluid can decompensate the patient’s cardiovascular system leading to hypovolaemia, and in severe cases, collapse and renal failure. Low albumin or sodium level can exacerbate this effect.
• The paracentesis site may continue to leak ascitic fluid post procedure. This may rarely continue to leak over days to weeks requiring stoma bag to collect fluid. The patient needs to be warned about the possible leaking which may otherwise cause distress.
• Perforation of an abdominal viscus e.g. bowel perforation, is a risk especially if intestinal obstruction is present.
• Haemorrhage (a particular risk if the INR is raised or platelets are low).
• Infection is a rare complication providing an aseptic technique is used.

4.5 Investigations prior to procedure

4.5.1 Ultrasound scan (USS)
If there is clinical evidence of substantial ascites in the form of tense abdomen and fluid thrill it is usually safe to proceed to drainage without USS imaging. An ultrasound scan will confirm the presence of ascites, and may determine if the fluid is ‘pocketed’ ‘loculated’ by tumour, adhesions etc.

A scan should be performed if:
• Ascitic fluid is not easily clinically identified i.e. possible other causes of abdominal distension such as hepatomegaly, abdominal tumour etc
• Difficulty with previous drainage or suspected loculation of ascites
• There is a chance of bowel obstruction

If any diagnostic uncertainty or the patient has previously been noted to have loculated ascites, arrange ultrasound scan with marking of maximum collection of ascites
If there is ascites clinically, or it is radiologically confirmed but the abdomen is not tense and there is no fluid thrill consider deferring the procedure as benefit will be limited.

4.5.2 Blood tests
In order to proceed with a safe paracentesis, the following should be considered as a guide. In some cases if likely benefits outweigh the risks, paracentesis can be performed despite poor blood results. In these cases, the patient should be made aware of the increased risk as part of obtaining informed consent.

- A platelet count and clotting screen should be measured in at-risk patient. Stop routine anticoagulation (3 days for warfarin, 1 day for subcutaneous heparin) before the procedure. INR should be 1.4 or less and platelets greater than $4\times10^9$ /L to safely proceed.
- A serum albumin and U&E should be taken if:
  - More than 4-6 litres is to be removed, and the patient has oedema, or
  - The patient is clinically dehydrated, or
  - The patient has reacted badly to previous paracentesis

<table>
<thead>
<tr>
<th>Caution should be exercised in those with:</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR greater than 1.4</td>
<td>Risk of haemorrhage. Consider the use of vitamin K to normalise the INR before proceeding</td>
</tr>
<tr>
<td>Platelets below 40</td>
<td>Risk of haemorrhage</td>
</tr>
<tr>
<td>Significant anaemia</td>
<td>May be worsened by haemorrhage, lower reserves for coping with procedure. May make correct attribution of symptoms more difficult.</td>
</tr>
<tr>
<td>Low sodium (less than 126)</td>
<td>Poor prognostic indicator. Paracentesis can cause further electrolyte disturbance</td>
</tr>
<tr>
<td>Abnormal potassium</td>
<td>Paracentesis can cause further electrolyte disturbance</td>
</tr>
<tr>
<td>Poor renal function</td>
<td>Lower reserves for dealing with fluid shift</td>
</tr>
<tr>
<td>Hepatic impairment</td>
<td>Lower reserves for dealing with fluid shift, may be associated with raised INR</td>
</tr>
<tr>
<td>Low protein and albumin (less than 20)</td>
<td>Likely to re-accumulate more quickly due to low oncotic pressure (production rate exceeds drainage rate), leading to significant intravascular depletion</td>
</tr>
<tr>
<td>Low white cell count / neutropenia</td>
<td>Risk of infection</td>
</tr>
</tbody>
</table>

4.6 Diuretics

Diuretics can be considered in those with a prognosis of several months as it takes 4-8 weeks to eliminate the excess fluid. Consider them where the serum ascites albumin gradient (SAAG) is $>11$g/L. In these cases, the success rate of spironolactone is 60% at 300mg. The patients most likely to respond to diuretic
therapy are those with liver metastases and liver failure, from cirrhosis. They will have a serum-ascites albumen gradient of >11g/dL and this can be used as a guide to the likelihood of response to diuretics.

- Measure baseline urea and electrolytes
- Measure abdominal girth and weight prior to starting diuretics
- Start with spironolactone 100-200mg mane
- Increase dose by 100mg every 5-7 days to achieve a weight loss of 0.5-1kg/24hours
- Typical maintenance dose is 300mg mane
- Consider adding furosemide 40mg mane if desired weight loss not achieved after 2 weeks (max 160mg)
- Monitor U&Es carefully as electrolyte disturbance (particularly hyperkalaemia) and hypotension may occur.
- Stop diuretics if do not achieve satisfactory reduction in ascites, cause renal impairment or not tolerated.

### 4.7 Other treatment modalities

Indwelling peritoneal catheter and peritoneo-venous shunts have been used in patients with a prognosis of >3 months. These can allow patients to manage their recurrent malignant ascites at home. Thus negating the need for regular hospital/hospice admissions for repeat large volume paracentesis.

Systemic and intraperitoneal chemotherapy has been used but, other than in chemosensitive ovarian carcinoma and lymphoma, no benefit has been shown.

### Procedure

<table>
<thead>
<tr>
<th>Action</th>
<th>Rationale</th>
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<tbody>
<tr>
<td><strong>BEFORE THE PROCEDURE:</strong></td>
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</tr>
<tr>
<td>Assess to confirm the presence of ascites</td>
<td>Exclude other conditions such as bowel obstruction and distension due to tumour</td>
</tr>
<tr>
<td>Blood tests (See section 5.5)</td>
<td>Ensure a safe procedure.</td>
</tr>
<tr>
<td>Stop anticoagulation (3 days for warfarin, 1 day for subcutaneous heparin)</td>
<td>Minimise the risk of haemorrhage</td>
</tr>
<tr>
<td>Consider ultrasound (See section 5.5)</td>
<td>If previous drainages have been difficult e.g. loculated fluid or there is doubt over the presence of fluid</td>
</tr>
<tr>
<td>If it is intended to drain to dryness, or large volume paracentesis (&gt; 6 litres) stop diuretics (if used solely for ascites) 48h before procedure.</td>
<td>Minimise complications during procedure</td>
</tr>
<tr>
<td><strong>PROCEDURE:</strong></td>
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</tr>
<tr>
<td>Obtain valid witnessed informed consent</td>
<td>This should be clearly documented in the notes</td>
</tr>
<tr>
<td>Take the patient's pulse and blood pressure (See section 6.1)</td>
<td>To inform speed of drainage.</td>
</tr>
<tr>
<td>Prepare a trolley of equipment</td>
<td>To minimise the risk of perforation</td>
</tr>
<tr>
<td>Ask the patient to empty their bladder</td>
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</tbody>
</table>
Ask the patient to lie supine in a comfortable position with the backrest slightly raised

To allow gravity to assist in the drainage

Confirm once again the presence of ascites. The usual site for paracentesis is the left side but can be in either iliac fossa at least 10cm from midline or supra-pubically (with empty bladder). The chosen site should:
- avoid scars,
- tumour masses,
- distended bowel or bladder,
- liver
- inferior epigastric artery that runs 5cm either side of the midline (see below), or be
- Guided by ultrasound marking

Usual sites for paracentesis, avoiding the inferior epigastric arteries.

<table>
<thead>
<tr>
<th>Action</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open dressing pack on trolley with “no touch” technique</td>
<td>To minimise the risk of infection</td>
</tr>
</tbody>
</table>
| Wash hands thoroughly, glove and prepare equipment
Clean the area with sterile solution e.g. chlorhexidine 2% | To minimise the risk of infection |
| Use aseptic technique throughout | To minimise the risk of infection |

Infiltrate up to 10ml of 2% lidocaine for injection into the area to be cannulated. Start subcutaneously and gradually infiltrate deeper until fluid is aspirated from the peritoneal cavity. Wait 3 minutes or until the patient reports numbness on testing with a needle prick.

For patient comfort and to aid cooperation with the procedure

If fluid is not obtained **consider whether it is safe to proceed.** In obese patients, peritoneum may not be reached with 1½ inch needle. **If there is any concern re safety of proceeding stop and review and/or obtain ultrasound to confirm presence and site of ascites.**

Insert large bore needle, cannula or Bonanno catheter into the peritoneal cavity. A scalpel is rarely required

At this point a sample can be taken for protein and albumin levels if required

Apply a drainable catheter bag

To collect and measure the ascitic fluid

Apply an adhesive dressing to the catheter if

To prevent it from becoming dislodged.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
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<tbody>
<tr>
<td>Document the procedure, plan for drainage and required frequency of observation in the notes</td>
<td>Sutures are rarely required</td>
</tr>
<tr>
<td>Take and record regular blood pressure and pulse measurements, and note the volumes drained. (See section 6.1)</td>
<td>This is normally required hourly, but may be more frequent in a high-risk patient. This allows monitoring of the fluid shift and guides decisions on the need for IV fluids.</td>
</tr>
<tr>
<td>If the patient becomes unwell, clamp the tube, take pulse, blood pressure and temperature and seek medical advice.</td>
<td>There is a risk of perforation, infection and hypovolaemia with this procedure</td>
</tr>
<tr>
<td><strong>POST PROCEDURE:</strong></td>
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<tr>
<td>Remove the catheter once the specified volume has been drained, or the drainage has slowed to a minimum.</td>
<td>Uncontrolled drainage may lead to</td>
</tr>
<tr>
<td>Aim to remove the drain by 24 hours (max 72 hours)</td>
<td>To minimise the risk of infection</td>
</tr>
<tr>
<td>The patient should be asked to lie on the opposite side to the drainage site for removal</td>
<td>Lying on the opposite side minimises the risk of leakage from the site</td>
</tr>
<tr>
<td>Apply a sterile gauze and adhesive dressing to the area. If leakage is heavy, a stoma bag may be required (Sometimes patients need a stoma pack over the site for several days). Sutures are rarely required.</td>
<td>To maintain asepsis and protect the wound</td>
</tr>
<tr>
<td>Patients often feel 'washed out' and weak during and in the last few hours after the procedure. Usually rest and reassurance (and analgesia if there is discomfort) are sufficient. If there is greater cause for concern, check blood pressure, assess need for medical review, intravenous fluids and consider other complications of paracentesis if appropriate.</td>
<td>Exclude possible post procedural complications</td>
</tr>
<tr>
<td>The patient may well need prn medication for breakthrough abdominal ache or soreness at the drain site and prn medication should always be available. <strong>Escalating pain, not controlled by prn medication, requires medical review.</strong></td>
<td>Patient comfort Exclude possible post procedural complications</td>
</tr>
</tbody>
</table>

### 4.8 Drainage rate and amount

Total amount drained will depend on the individual patient, their blood results, previous experiences with paracentesis, the apparent volume on clinical assessment of paracentesis and the location of the patient.
Most patients will tolerate the procedure well. If the patient is normotensive prior to procedure, it is safe and effective to drain up to 5 litres over the first 4 hours without intravenous fluid replacement. The patients most vulnerable to symptomatic hypotension (hypovolaemia) are those with ascites arising secondary to portal hypertension. In patients with massive liver metastases, hepatocellular carcinoma +/- cirrhosis, or venous outflow obstruction the risk of hypovolaemia is higher. **Hence the importance of asking the patient to report symptoms of dizziness, and BP monitoring.** There is no evidence to support intravenous albumin replacement in malignant ascites.

<table>
<thead>
<tr>
<th>Observations</th>
<th>Rate</th>
<th>Fluids</th>
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<tbody>
<tr>
<td>Systolic Blood Pressure greater than 100 prior to and throughout procedure</td>
<td>Free drainage of up to 5L over the first 4 hours, then reduce rate and drain 1L per hour until drainage slows to a minimum or the required amount is drained</td>
<td>Not usually required</td>
</tr>
<tr>
<td>Check BP and pulse hourly for the first four hours, then as required</td>
<td>Drain 1/2L per hour and limit total amount drained. Stop if BP falls significantly or symptoms of hypovolaemia develop (e.g. dizziness, increasing fatigue and malaise)</td>
<td>Consider fluid replacement with IV saline</td>
</tr>
<tr>
<td>Systolic blood pressure less than 100 prior to or during procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check BP and pulse hourly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal failure or dehydration</td>
<td></td>
<td>Consider fluid replacement with IV saline</td>
</tr>
<tr>
<td>Liver cirrhosis</td>
<td></td>
<td>Consider 20% albumin, 100ml for every 2L drained</td>
</tr>
</tbody>
</table>

5. **TRAINING/SUPPORT**

Nursing professionals will receive appropriate competency based training and direction on paracentesis procedure and management. The professional position outlined in the NMC Code of Professional Conduct, states clearly that:

Paragraph 6.2

‘To practice competently, you must possess the knowledge, skills and abilities required for lawful, safe and effective practice without direct supervision. You must acknowledge the limits of your professional competence and only undertake practice and accept responsibilities for those activities in which you are competent’.

The General Medical Council Good (GMC): Good Medical Practice (GMP) sets out the core standards of behavior expected of doctors practicing in the UK. As per GMC Good Medical Practice: Duties of a doctor Medical professionals will provide a good standard of practice and care.

- Keep your professional knowledge and skills up to date
- Recognise and work within the limits of your competence
6. MONITORING COMPLIANCE WITH THE PROCEDURAL DOCUMENT

<table>
<thead>
<tr>
<th>What is being Monitored</th>
<th>Who will carry out the Monitoring</th>
<th>How often</th>
<th>How Reviewed/ Report to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education and Training</td>
<td>Specialist Palliative Care Consultant</td>
<td>Quarterly</td>
<td>Training sessions to be provided as required. Attendance record kept.</td>
</tr>
<tr>
<td>Numbers of procedures</td>
<td>Specialist Palliative Care Consultant/ Imaging Nursing Team</td>
<td>Quarterly</td>
<td>Audit of practice. Results to each CSU and action plan to be developed to address.</td>
</tr>
<tr>
<td>Complications associated with procedure</td>
<td>Specialist Palliative Care Consultant/ Imaging Nursing Team</td>
<td>Quarterly</td>
<td>Audit of practice. Results to each CSU and action plan to be developed to address.</td>
</tr>
</tbody>
</table>

7. DEFINITIONS

**Ascites:** is an accumulation of fluid within the peritoneal cavity of the abdomen and can occur in association with many conditions such as cancer, cirrhosis of the liver, congestive cardiac failure, and protein depletion.

**Paracentesis:** is the procedure of removing ascitic fluid from the abdominal cavity. The commonest causes of malignant ascites are primary tumours of breast, colon, ovary, stomach, pancreas and bronchus. Paracentesis is a simple procedure, which can be performed as a day case (usually only removing 2-4 litres maximum), occasionally if clinically indicated in patients own home (small volume paracentesis) or as an inpatient. In tense ascites there may be up to 12 litres of ascites present. Removal of 4–6 litres is usually enough for to give symptomatic relief. Removal of more than 4-6 litres increases the risk of hypovolemia and adverse effects, but may give symptom relief for longer until the ascites re-accumulates.

8. EQUALITY IMPACT ASSESSMENT

An Equality Impact Assessment (EIA) has been conducted on this procedural document in line with the principles of the Equality Analysis Policy (CORP/EMP 27) and the Fair Treatment For All Policy (CORP/EMP 4).
The purpose of the EIA is to minimise and if possible remove any disproportionate impact on employees on the grounds of race, sex, disability, age, sexual orientation or religious belief. No detriment was identified.

A copy of the EIA is available on request from the HR Department.

9. ASSOCIATED TRUST PROCEDURAL DOCUMENTS

- Hand Hygiene Policy - PAT/IC 5
- Safe use and Disposal of Sharps Policy - PAT/IC 8
- Collection and Handling of Pathology Specimens - PAT/IC 11
- Spillages of Blood and Other Body Fluids Policy - PAT/IC 18
- Standard Precautions Policy - PAT/IC 19
- Aseptic Non-Touch Technique Policy - PAT/T 32
- Privacy and Dignity Policy - PAT/PA 28
- Policy for Consent to Examination or Treatment - PAT/PA 2
- Mental Capacity Act 2005 Policy and Guidance - PAT/PA 19
- Policy for the Transfer of Patients and their Records - PAT/PA 24

10. REFERENCES & ACKNOWLEDGEMENT

8. National Institute for Clinical Excellence The PleurX peritoneal catheter drainage system for vacuum-assisted drainage of treatment-resistant, recurrent malignant ascites March 2012

Acknowledgement:
Policy and procedure for paracentesis. The Rowans Hospice, 2011
Accessed through www.palliativedrugs.com

Guidelines for the Management of Malignant Ascites, St Peters Hospice, Bristol 2008 Accessed through www.palliativedrugs.com
Guidelines for the Management of Malignant Ascites, St Francis Hospice, Romford, 2003 Accessed through www.palliativedrugs.com

APPENDIX 1

EQUIPMENT REQUIRED FOR PARACENTESIS

<table>
<thead>
<tr>
<th>Equipment Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needles (orange × 1, green needle × 2)</td>
</tr>
<tr>
<td>Syringes (two 10ml)</td>
</tr>
<tr>
<td>Local anaesthetic</td>
</tr>
<tr>
<td>(10ml of Lignocaine 1% or 2%)</td>
</tr>
<tr>
<td>Sterile cleaning solution</td>
</tr>
<tr>
<td>e.g. Chlorhexidine 0.05% aqueous solution (Unisept) / Povidone iodine</td>
</tr>
<tr>
<td>Large bore venflon (16G or 18G) or Bonanno catheter pack</td>
</tr>
<tr>
<td>(To discuss with Doctor)</td>
</tr>
<tr>
<td>Sterile dressing pack</td>
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<tr>
<td>Sterile gloves</td>
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<tr>
<td>Large sterile drainable catheter bag with stand</td>
</tr>
<tr>
<td>Sterile gauze</td>
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<tr>
<td>Adhesive dressing e.g. mepore, hypafix</td>
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<tr>
<td>Inco pad</td>
</tr>
<tr>
<td>Paracentesis kit</td>
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<tr>
<td>Plastic apron</td>
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<tr>
<td>Sharps bin</td>
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PleurX Drains

For some patients with large volume recurrent ascites a PleurX drain may be considered

Please contact the DSA staff for advice DRI x4712

Possible advantages of using Pleurx to manage recurrent malignant ascites:

- Avoids the need for repeat needle drainage procedures (paracentesis).
- Less visits to hospital and reduced hospital length of stay.
- Home management
- Prevents large build-up of fluid as you can drain smaller quantities, more often. This may give better symptom control
- Pleurx is usually well tolerated and has few complications.

The NICE guidance\(^8\) suggested that the lives of patients suffering from treatment-resistant ascites can be improved by the PleurX system, as the drainage of fluids can be carried out by patients at home. PleurX frees patients from the limitations of gravity drainage procedures which can take longer periods of time and restricts patient's movement.