

Abdominal Paracentesis: Provisional Sample Protocol for Gynaecologic Oncology Patients, The Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust, UK

Abstract

Aims and Objectives: The thesis or central idea about this protocol was to create a provisional or sample protocol which could be programmed to evolve and improve over time, through a systematic review process, say, every two years, in the department. Thus, its aim was to provide a harmonised surgical care approach to performing abdominal paracentesis through evidence-based initial sample protocol, which if later approved, would be used by all staff including trainees, involved in the management of gynaecological oncology patients, who needed abdominal paracentesis performed on them, for therapeutic and investigative reasons, and for symptomatic relief.

Thus, the ultimate goal was the development of new, harmonized approach or model for surgical care, and for the training of the next generation of surgical specialists, with high standards of clinical practice to improved care outcomes, for this group of patients.

Definitions: Abdominal paracentesis is a surgical procedure in which a specially designed needle is used to remove a sample of fluid or to drain an abnormal accumulation of intra-abdominal fluid. It is sometimes called or generally referred to as peritoneocentesis. In the latter, the peritoneal cavity is punctured with a specially designed needle to sample peritoneal fluid. This procedure is used to remove fluid from the peritoneal cavity, especially when this cannot be removed by the use of medication. In another way, it can be defined as a procedure which involves the surgical puncture of the abdominal cavity with a needle followed by a placement of a catheter line for the removal of excess peritoneal fluid. It is thus, a safe effective procedure used for therapeutic and diagnostic assessment, and evaluation of many intra-abdominal pathological problems. It often provides significant symptomatic relief which enables patients to engage and perform other recuperative activities.

Historically, it has evolved as with other procedures and currently many specialists would perform ultrasound before attempting manual abdominal paracentesis. Others advocate ultrasound-guided abdominal paracentesis, as it appears to be comparatively less painful and less time-consuming; that is; the abdominal paracentesis can be performed at the same time that abdominal and pelvic ultrasound is performed to locate ascitic fluid and mark safe site(s) for its sampling or removal.

Materials and methods: As this is an initial sample protocol, there was no specific methods or approaches used other than collation of approaches in gynaecology oncology literature. These were then analysed and synthesized to bring about what could be a more generally acceptable sample, or a "common

Reasons for the procedure

Diagnostic: To determine the reason for fluid accumulation in the abdomen, which may occur due to: internal bleeding after an injury (usually a liver or spleen injury), infection, cancer (gynaecological or non-gynaecological), liver disease (including cirrhosis of the liver), pancreatic disease, peritoneal disease. In this case, any fluid sample removed is further analysed and investigated to assist in reaching a diagnosis or stage of the disease.

Therapeutic: This procedure may also be performed when excessive fluid accumulation in the abdomen makes breathing difficult and/or causes pain. In these cases, fluid is withdrawn to make breathing

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Anthony Emeka Madu

Specialist Registrar, Obstetrics and Gynaecology Department, Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust, Boston, Lincolnshire, UK

Correspondence: Anthony Emeka Madu, Specialist Registrar, Obstetrics and Gynaecology Department, The Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust, Boston, Lincolnshire, UK. Tel +447931626315, Email emymadu@yahoo.co.uk

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or middle ground" acceptable template. These published works were also systematically referenced accordingly. The final provisional sample protocol must then be reviewed by relevant senior practitioners at multidisciplinary meetings, and make recommendation(s) to amendment or reviewed before the final draft sample would be adopted for use.

Results: The below sample was produced and sent to be reviewed by the relevant senior practitioners in the Gynaecology Oncology Team.

Conclusion: As new scientific knowledge and technology emerge, the produced protocol (template) can be reviewed and updated. It is suggested that the approved protocol be reviewed and updated every two years, in line with the emergence of new evidence or scientific knowledge.

Keywords: ovarian disease, pelvic/abdominal ultrasound, ascitic fluid, paracentesis, pelvic/abdominal disease

easier and to relieve abdominal discomfort. This is perhaps, the most common indication of abdominal paracentesis in Gynaecologic Oncology practice.

Risk factors for complications during the procedure: Bleeding disorders, malnutrition, hernia in or on the abdomen, excess scar tissue from previous surgeries or injuries, pregnancy, severe intestinal inflammation or distension, bladder distension not decreased by emptying the bladder via a catheter, enlarged spleen or liver, distended bowel due to an obstruction, infection in the area where the paracentesis instrument will be inserted, severe acute abdominal condition requiring immediate surgery.

Indications: New onset ascites or ascites of unknown origin. Patient with a known ascites who has fever, abdominal pain, hypotension or encephalopathy. Symptomatic treatment of large ascites.

Contraindications

- Unco-operative patient.
- Uncorrected bleeding diathesis
- Acute abdomen that requires surgery
- Intra-abdominal adhesions
- Distended bowel
- Abdominal wall cellulitis at the site of puncture
- Pregnancy.

Step-by-Step approach

Explain the procedure to the patient and obtain a written informed consent, if possible. Explain the risks, benefits and alternatives. Commercial paracentesis kits are pre-assembled. If you do not have a commercial kit, this is a list of the equipment you need to perform a successful paracentesis:

- 16 G Angiocath (or a spinal needle) x 1
- 10 cc syringe x 1
- One-liter vacuum bottle x 5
- Thoracentesis kit tubing x 2, Bonanno catheter or other similar catheters
- Sterile gloves x 2
- Betadine swab x 3
- Sterile drape x 2
- 4x4 sterile gauze x 4
- Band-aid x 1

Six steps of the paracentesis procedure

- I. Review patient notes and details including results (blood test including clotting profile, X ray, CT scan Ultrasound scan and MRI scan)
- II. Physical examination
- III. Ultrasounds can before the procedure
- IV. Patient preparation
- V. Procedure
- VI. Laboratory results.

Ultrasound scan before the procedure: It is very helpful/useful to get an ultrasound scan of the ascites before the procedure. Ultrasound can be used statically to mark a safe entry site of a bonanno catheter prior to paracentesis, or dynamically to see the needle advancing into the peritoneal cavity. The latter is more useful for smaller fluid collections. Use a 2-5 MHz low-frequency curvilinear transducer under the abdominal setting to scan the abdomen.

The radiologist will mark the spot for paracentesis. Two questions or two things are important here: What is the **distance from the skin to the fluid**? Usually, 1 cm. It gives you an idea how deep you have to go with the needle before

getting fluid in the syringe. What is **distance to the midpoint of the collection**? Usually, 3 cm. It gives you an idea how deep you can go with the needle in relative safety. Generally, the advice is as soon as you reach the fluid, to advance the needle just a little and then to thread in the plastic catheter, and to take the needle out. The diagrams below illustrate this point:

Figure 1. Ultrasound marking, site of insertion and direction of Angiocath needle is illustrated below:

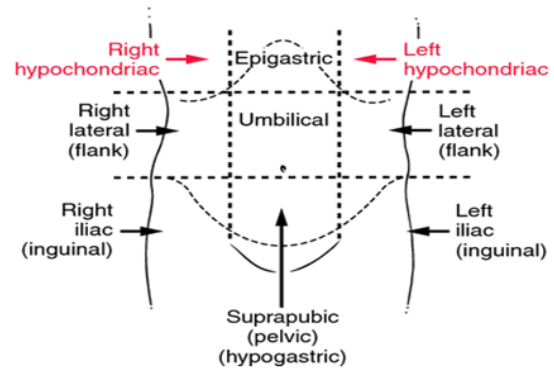


Figure 1 Lammon et al., 1995.

Figure 2. Also important before the procedure are the below information: Ultrasound marking of safe site for the insertion and direction of Angiocath needle as stated above. Ultrasound report of ascites before performing abdominal paracentesis.

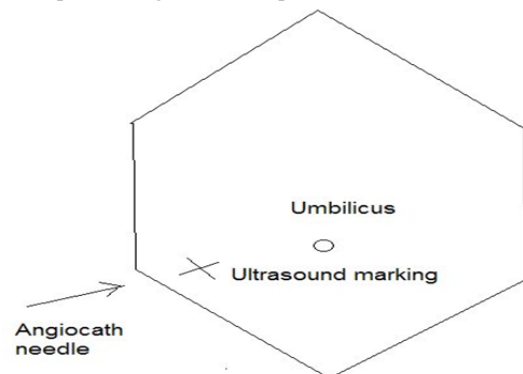


Figure 2 Dimov V (2004).

Patient preparation: Explain the risks, benefits and alternatives to the patient. Make sure that she understands and agrees. If the patient does not understand the procedure, she cannot or she cannot provide an informed consent and you have to ask a relative who has a durable Power of Attorney for healthcare or the patient's next of kin. Engage with the patient and explain what is going on while performing the procedure. This will alleviate both the patient's anxiety and yours. Ask the patient to urinate before the procedure or use a Foley catheter to empty her bladder. Position the patient on the bed with the head elevated at 45-60 degrees, to allow fluid to accumulate in lower abdomen.

NB: If the procedure is scheduled (rather than done in an emergency): Many authorities advise the patient not eat or drink for about twelve hours before the procedure, and in cases where the procedure is performed in the theatre.

Always remember to empty the bladder just before the procedure. During the procedure, anaesthesia (local infiltration) and IV fluids if needed (e.g., if her blood pressure is low).

Anaesthesia: Local (1% lignocain is suggested).

Preparation for the procedure

Get all the items ready at the patient's bedside. Briefly explain to the patient what the different parts of kit are used for. Get a trash bin nearby to dispose of the plastic envelopes of needles and tubing. The patient should lie on his back in a slightly recumbent position toward the site of paracentesis. Routine cleansing and draping of the clinician who is going to perform the procedure.

Percuss the area of dullness to ensure that it corresponds well with the ultrasound marking. Insertion site is usually inferior to the umbilicus and at the level of percussed dullness, usually 2-3 fingerbreadths below the umbilicus.

In general, select a point on the abdominal wall in the right or left lower quadrant, lateral to the rectus sheath. If a suitable site cannot be found through percussion and palpation, consider using an ultrasound to mark an appropriate spot. The site and surrounding area are cleaned with chlorhexidine (2%) and then apply a sterile drape. Alternatively, clean the area with betadine (povidone-iodine, also known as iodopovidone), or any other approved topical antiseptic, in a circular fashion from the centre out. Then apply the sterile drapes. You will place the opened parts of the kit on the drape.

Open the 16 G Angiocath and syringe, place them on the sterile drapes. Place the 1-L vacuum bottles nearby.

From this point on, you must wear sterile gloves. So, please ensure that you have everything you need in the sterile area. It is time-consuming to have to reach for, let's say additional tubing in the non-sterile area and then to remove the contaminated or soiled sterile gloves and to put new ones. This is important to make sure that you have everything you need for the procedure in the sterile area. Try to make sure that the Angiocath fits the tubing. All needles, syringes and tubing should fit.

Procedure technique

If the marked site is in the right or left quadrant of the abdomen, **pull the skin down** and go in with the Angiocath, **then release the skin** (this is called **Z-technique** which creates a skin track to stop ascitic fluid from leaking out after the procedure). Aspirate as you go in. Once you reach fluid in the needle, advance the needle just a little further, then thread in the plastic part while withdrawing the needle. Aspirate again to make sure that the plastic catheter is still inside the fluid collection. If you get fluid in the syringe, it shows you are in order. Then unscrew the syringe and connect the tubing to the 1-L vacuum bottle. If you cannot get fluid after withdrawing the needle, try to reposition the catheter. If still there is no fluid, you can try to pull out and reintroduce the needle (if kept sterile). Do not push hard or deeper than the midpoint of the collection as seen on the ultrasound scan. If you are unsuccessful in obtaining ascitic fluid, you can ask for an ultrasound-guided paracentesis. Always remember when to call for help. After the procedure, ask the patient to lie in his bed for 4 hours and the nurse to check vital signs every 1 hourly for 4 hours to detect any hypotension that can occur following the procedure.

It is generally recommended to give 25 mls of albumin (25% solution) for every 2 liters of ascitic fluid removed. For example, in some cases, if the patient had a 4-litre paracentesis, she should receive 50mls of albumin IV (25% solution) over 2 hours as indicated. The rationale for giving albumin is to prevent intravascular fluid shift and renal failure after a large-volume paracentesis.

The amount of fluid removed depends on the reason for this procedure. For diagnosis, small amounts of fluid are removed. For

patients having trouble breathing, anywhere from 1-4 litres of fluid may be removed.

After the needle is removed, a small bandage is put over the area of insertion. In case of malignant ascites (ie, accumulation of abdominal fluid due to direct effects of the cancer) and when the goal of therapy is patients' comfort, a larger amount of fluid, even 4-6 litres, can be removed at one time. If possible, this should be performed with administration of intravenous albumins to minimize the risk of complications. The practise of intermittent clamping is no longer logical unless the patient is haemodynamically unstable Figure 3.

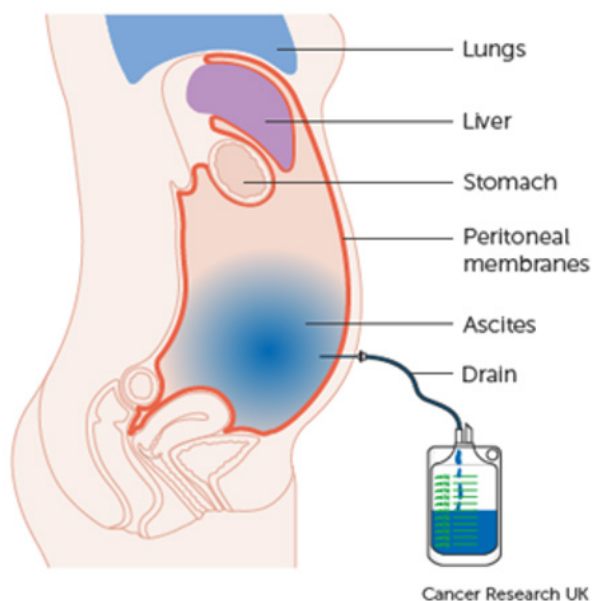


Figure 3 Paracentesis catheter and drainage flask in place; cancer research UK (undated).

Complications include; persistent leaks from the puncture site, abdominal wall hematoma perforation of bowel, peritonitis, hypotension after a large-volume paracentesis.

Other possible complications are:

- I. Perforation of bowel.
- II. Peritonitis.
- III. Hypotension after a large-volume paracentesis.
- IV. Dilutional hyponatremia.
- V. Hepatorenal syndrome.
- VI. Major blood vessel laceration.
- VII. Catheter fragment may be left in the abdominal wall or cavity following the procedure.
- VIII. Laboratory examination of the removed fluid should be performed.
- IX. Abdominal paracentesis can take as little as 10-15 minutes, but more time is required if there is a great deal of fluid to remove.
- X. Warn the patient there will be some stinging or burning while the anaesthesia is being injected, but once the area is numbed, she should not feel the actual paracentesis.
- XI. In some patients especially with ovarian cancer, the procedure may be repeated again; this can result in loss of body protein (be aware of it).

Average Hospital Stay: No hospital stay is usually needed, if the procedure is performed for diagnosis. If she has a lot of fluid or are having trouble breathing or other problems, she may need to stay in the hospital till she is stable.

Postoperative care: she should stay in the recovery room for a few hours if the procedure was performed in theatre, so that her blood pressure and other vital signs can be monitored.

Outcome: the patient should be advised to take it relatively easy the day after her procedure, but she would not need to continue to restrict her activities based on having had an abdominal paracentesis. Warn her that abdominal fluid can recur until the condition causing it has been treated. Therefore, she may need to have the procedure performed again. In some situations, usually in patients with terminal cancer, where abdominal fluid continues to accumulate, instead of performing the paracentesis repeatedly, a catheter is inserted through the abdominal wall and left inside to drain accumulated fluid without repetitive needle insertions. If the patient goes home, advise her to watch out for the following signs and contact the Gynaecologic Oncology Team or her General Practitioner (GP) immediately;

- I. Signs of infection, including fever and chills.
- II. Redness, swelling, increasing pain, excessive bleeding, or discharge from the paracentesis site.
- III. Swelling of the abdomen.
- IV. Feeling faint or lightheaded.

Write a procedure note which documents the following: the patient's consent and indication(s) for the procedure; relevant laboratory test results, e.g., INR/PTT, platelet count; procedure technique; sterile preparation; anaesthetics; amount of fluid obtained; character of the fluid obtained; estimated blood loss; any complications which occurred and tests ordered.

Laboratory results: send the sample to the laboratory. Usually, you send only one of the 1-L bottles. The rest of the bottles (2-3), if it was a large-volume paracentesis) are disposed of in the biohazard area. Order the relevant tests and check them yourself or sign out for somebody to check them. General laboratory tests include: full blood count, urea and electrolyte, liver function tests, albumin, amylase, lipase, INR/PTT. Laboratory tests on the paracentesis ascitic fluid include: Protein, albumin, specific gravity, glucose, bilirubin, amylase, lipase, triglyceride, LDH, cell count and differential, culture & sensitivity, gram stain, AFB, fungal, cytology, pH.

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Conflicts of interest

The author declares there is no conflict of interest.

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