# *33425488*

**Request # 33425488** **SEP 04, 2012**

**Mail To:**

Elmhurst Hospital Center
Peter Nicholas Health Science Library (METRO #41)
79-01 Broadway
Elmhurst, NY 11373

**DOCLINE: Journal Copy EFTS Participant**

| | |
|---|---|
| Title: | Surgery, gynecology & obstetrics |
| Title Abbrev: | Surg Gynecol Obstet |
| Citation: | 1979 Dec;149(6):889-92 |
| Article: | A technique for peritoneal lavage without risk or |
| Author: | Lazarus HM;Nelson JA |
| NLM Unique ID: | 0101370 Verify: PubMed |
| PubMed UI: | 505267 |
| ISSN: | 0039-6087 (Print) |
| Fill from: | **Any format** |
| Publisher: | Martin Memorial Foundation [etc.], Chicago |
| Copyright: | Copyright Compliance Guidelines |
| Authorization: | Sheryl Ramer |
| Need By: | N/A |
| Maximum Cost: | **$11.00** |
| Patron Name: | Dr. Scott Weingart |
| Referral Reason: | Not owned (title) |
| Library Groups: | BQSIMB,METRO |
| Phone: | 1.718.334-2040 |
| Fax: | 718.334.5690 |
| Email: | ehc-library@nychhc.org |
| Alt Delivery: | Email(PDF),Email(TIFF),Fax,Web(PDF) |
| Comments: | ****we prefer e.mail if possible **** |
| Routing Reason: | Routed to NYUMAI in Serial Routing - cell 1 |
| Received: | Sep 05, 2012 ( 10:23 AM ET ) |
| Lender: | Maimonides Medical Center/ Brooklyn/ NY USA (NYUMAI) |



**Bill via EFTS only to: NYUCHF**

Elmhurst Hospital Center
Peter Nicholas Health Science Library
79-01 Broadway
Elmhurst, NY 11373

# THE SURGEON AT WORK

## A TECHNIQUE FOR PERITONEAL LAVAGE WITHOUT RISK OR COMPLICATION

Harrison M. Lazarus, M.D., F.A.C.S., *and* James A. Nelson, M.D., *Salt Lake City, Utah*

SINCE the introduction of peritoneal lavage for evaluation of abdominal trauma by Root and associates (3), many surgeons have used this technique. In many studies, the accuracy rate ranges from 96 to 100 per cent. This degree of accuracy is contrasted with abdominal paracentesis which has a high percentage of false-negative results. However, a significant number of complications occur with peritoneal lavage ranging from 0.9 to 6.0 per cent. In contrast, the reports of diagnostic abdominal paracentesis contain no significant complications. A procedure is needed that will combine the accuracy of peritoneal lavage with the safety of paracentesis. Such safety will allow peritoneal lavage to obtain its rightful place as the single most important tool for evaluating intra-abdominal injury. To reach this goal, a method of performing the procedure of peritoneal lavage is needed which avoids the risk and complications of the present technique. With or without a minilaparotomy, as proposed by Perry and Strate (2), the list of possible complications include lacerations of mesenteric vessels, lacerations of iliac artery or iliac vein, small intestinal perforations, colonic perforations, hematoma of the rectus muscle, incisional hernia, wound infection, wound hematoma and wound separation. We experienced a small intestinal perforation from the standard 11F peritoneal dialysis catheter. After this complication, we sought to develop a safe method to introduce a catheter into the peritoneal cavity for lavage. Our system takes advantage of the safety demonstrated by abdominal paracentesis. Now, three years after developing a system thought to be safe, we have evidence that, in fact, it is as safe and easy to use as we envisioned.

From the Departments of Surgery and Radiology, University of Utah, Salt Lake City.

### MATERIALS AND METHOD

This sytem uses a sharp needle combined with a guide wire and catheter combination for safely introducing a lavage catheter. Necessary materials are available as a disposable kit which provides materials for a safe and effective technique of performing peritoneal lavage. Items needed for the introduction of a large bore catheter in a safe, minimally traumatic way are conveniently packaged together. The largest sharp object that is introduced into the abdomen is an 18 gauge needle which reduces the morbidity associated with the larger trocar of peritoneal dialysis catheters. The guide wire allows introduction into the peritoneum of a 9F catheter, 15 centimeters long, with an end hole and six side holes for carrying out the standard lavage procedure. The kit facilitates the evaluation of the abdomen for intra-abdominal disease, either traumatic or otherwise, by the presence of erythrocytes and leukocytes in the returned lavage fluid.

The patient should have voided or have a Foley catheter in place. The patient is placed in the supine position. The preferred site for lavage is in the midline, a third of the way down from the umbilicus to the pubis. The inferior aspect of the umbilicus could be used. The site of choice may have to be altered if there is a previous midline scar.

The abdomen is prepared with a shave. The skin is prepped with antiseptic swabs and draped with a fenestrated drape. The site for lavage is anesthesized, using 1 per cent Xylocaine, lidocaine, with epinephrine through a 25 gauge needle to raise a skin wheal. Xylocaine with epinephrine prevents false-positive results from a bleeding skin edge. A 3 millimeter vertical skin incision is made with the No. 11 scalpel blade.

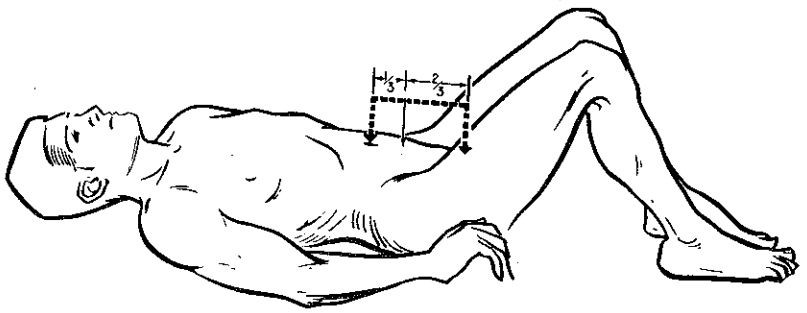


FIG. 1. Introduction of guide wire intra-abdominally. A 3 millimeter skin nick is made one-third the distance from the umbilicus to the pubis. The 18 gauge needle is placed through the fascia and peritoneum. The wire guide, floppy end first, should fall easily into the abdomen.

The 18 gauge needle is then introduced posteriorly and at a slightly inferior direction in the mid saggital plane so that the needle is headed toward the center of the pelvic hollow. The patient will momentarily experience pain as the needle penetrates the peritoneum. The needle should then be advanced another 2 to 3 millimeters within the abdominal cavity. If the patient is able to co-operate, tension of the abdominal muscles during the introduction of the needle aids this step.

The floppy end of the wire guide is introduced through the needle into the peritoneum. The guide should fall easily into the abdomen if the needle has, in fact, penetrated the fascia and peritoneum. If the guide wire does not easily fall into the abdomen, remove the wire and advance the needle several millimeters until the wire does fall freely into the abdominal cavity (Fig. 1). After approximately one-half of the length of the wire is in the peritoneum, the needle is removed.

The Teflon, polytetrafluroethylene, catheter is now placed over the wire and into the peritoneum; the stiff end of the wire must be visible exiting from the end of the catheter. The catheter is introduced into the peritoneum with a twisting pushing motion applied to the catheter at the skin level so as to penetrate the fascia (Fig. 2). After the catheter is introduced, the wire guide is removed. The catheter is now ready for aspiration and lavage.

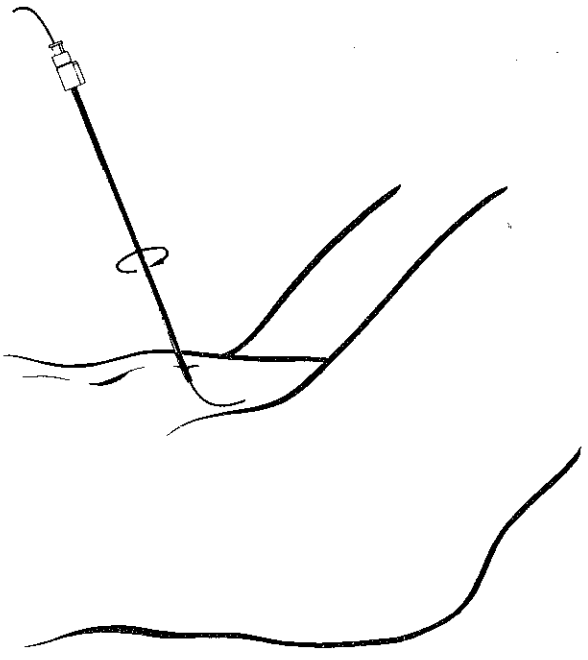

FIG. 2. Introduction of lavage catheter. The Teflon catheter is placed over the guide wire into the abdomen by applying a twisting motion to the catheter at the skin level.

If the aspiration is nondiagnostic, then saline solution, 20 milliliters per kilogram up to 1,000 milliliters, is run into the peritoneal cavity. The fluid is allowed to mix with gentle manipulation of the patient. Then the intravenous tubing at the bottle is cut and placed into the bottle on the floor so that the lavage fluid can drain freely by gravity with a siphoning effect (Fig. 3). The fluid that is removed is analyzed for erythrocytes using a counting technique or comparing whether or not the fluid in the intravenous tubing is such that newspaper print cannot be read through it. Analysis of the fluid for material other than erythrocytes can be performed as indicated.

## RESULTS AND DISCUSSION

This technique of performing peritoneal lavage has been used in 110 patients by 45 different physicians. The physicians were at various levels of training and experience ranging from interns to Board Certified surgeons. In these 110 patients, there has not been a single complication. In patients with positive findings at lavage, no

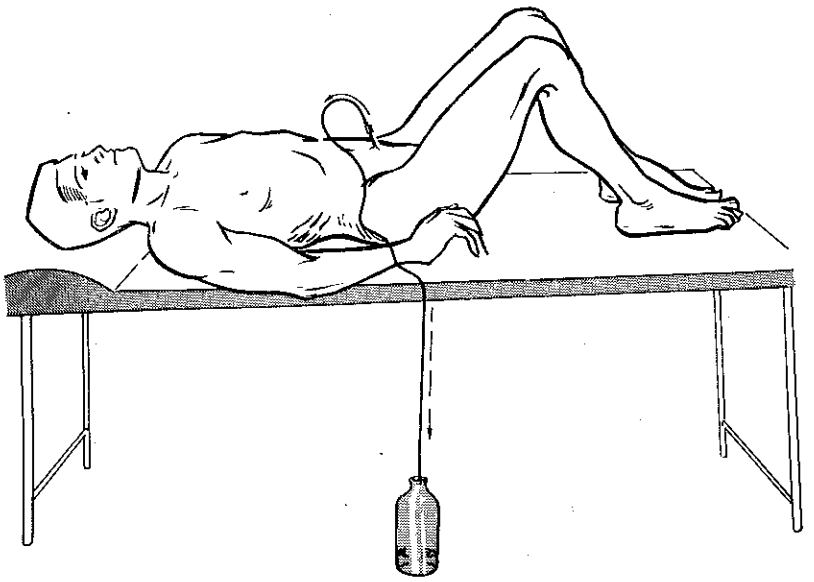

FIG. 3. Retrieval of lavage fluid. The infusion tubing is cut off so that fluid can return from the abdomen by the siphoning effect into a receptacle placed on the floor.

evidence that injury to vessels, intestine, omentum or bladder had occurred due to the lavage procedure. No wound complications resulted from the small 3 millimeter skin nick used to facilitate the technique. This low morbidity is in contrast with the number of wound complications others have found using the minilaparotomy to place safely the standard dialysis catheter.

Needle paracentesis has no significant morbidity. In over seven years experience using an 18 gauge spinal needle, McClelland and Shires (1) reported no complications with the four quadrant tap. Occasionally, they entered the bowel with the 18 gauge needle, but the hole sealed immediately without leakage. In our system, in which a single sharp needle stick is used rather than four, this type of complication is even less likely to occur. The use of a sharp needle compared with a relatively dull 11F dialysis trocar gives the examining physician greater control and feel for when the fascia is penetrated. The end of the floppy tipped wire will fall freely through the needle into the abdominal cavity verifying that the needle has penetrated the abdominal wall and peritoneum and that the needle tip is not against the peritoneum or the fascia. It is extremely unlikely that this soft floppy tipped wire can injure any intra-abdominal organs. Once the wire is in place, the only sharp object, the 18 gauge needle, is removed. The Teflon catheter is easily placed into the abdomen over the guide wire and has caused no injuries. Experimental flow studies revealed that the flow is increased less than 5 per cent for each side hole after the third hole. Six spiraled side holes were made to ensure good flow and adequate peritoneal fluid sampling.

We have had no false-positive or false-negative results. The avoidance of the minilaparotomy reduces the chances of blood being introduced to give a false-positive result. Early in this series, there were six nondiagnostic lavages because no fluid returned. Enlarging the catheter from a 7F to a 9F decreased this problem. Replacing the wire and reintroducing the catheter has solved this problem which rarely occurs.

The accuracy of peritoneal lavage has been clearly shown. Indications for use include hypotension, unexplained blood loss, abdominal pain and tenderness, altered state of conciousness or spinal cord injury making abdominal examination unreliable, multiple injuries requiring anesthesia for extra-abdominal procedure and other injuries leading to suspicion of intra-abdominal injury. The absolute contraindications for use of the technique are the decision to operate anyway, gravid uterus and full bladder. The relative contraindications are previous lower abdominal operations and a hematoma of the abdominal wall. The only limitation in using peritoneal lavage by many individuals up to now has been its attended morbidity.

The technique reported herein with its low incidence of risk or complication will facilitate and

increase the use of peritoneal lavage in the evaluation of abdominal trauma. The accuracy of lavage combined with the safety of this catheter technique should encourage its routine use in evaluation of abdominal trauma much as computerized tomographic scans have been adopted for evaluation of head trauma. Peritoneal lavage is now an easy, safe and reliable test for the detection of abdominal injury. In contrast with other recent diagnostic advancements, catheter peritoneal lavage is low technology and requires no expensive equipment. This factor makes peritoneal lavage even more attractive and cost effective.

The high mortality associated with abdominal trauma due to unrecognized intra-abdominal injury should decrease with increased use of diagnostic peritoneal lavage. A mortality of as high as 66 per cent can occur because of delay in diagnosis. Early detection of intra-abdominal bleeding will facilitate surgical correction and improve survival of the injured victim. Peritoneal lavage should eliminate unrecognized abdominal injury as a cause of death. Such fatalities will be relegated to the history books in the same way that peritoneal lavage already relegated the disease entity delayed rupture of the spleen to historical interest as being delayed recognition of splenic rupture.

SUMMARY

A technique for peritoneal lavage with an extremely low risk of complications has been developed. This technique has been used on 110 patients by 45 different physicians without morbidity.

REFERENCES

1. McClelland, R. N., and Shires, T. Management of liver trauma in 259 consecutive patients. Ann. Surg., 1965, 161: 248.
2. Perry, J. F. Jr., and Strate, R. G. Diagnostic peritoneal lavage in blunt abdominal trauma; indications and results. Surgery, 1972, 71: 898.
3. Root, H., Hansen, C., McKinley, C., and others. Diagnostic peritoneal lavage. Surgery, 1965, 57: 633.