CLINICAL PATHOLOGY IN GENERAL PRACTICE

PLEURAL, PERICARDIAL, AND PERITONEAL TAP

BY

THOMAS PARKINSON, M.D., M.R.C.P.

*Consulting Physician to the Luton and Dunstable Hospital and St. Mary's Hospital, Luton;
Chief Clinical Assistant to the Brompton Hospital, London*

Laboratory examination of serous effusions is a valuable adjunct to clinical diagnosis. The interpretation of the pathological changes in these fluids will be described later in this series. The present article is concerned only with the methods of obtaining specimens for examination. The technique of diagnostic pleural tap is described in detail, since this procedure is the one most often called for in practice. Pericardial tap, which is seldom indicated, and peritoneal tap, which is less informative, are described more broadly, some of the detail previously described being assumed.

Pleural Tap

Aspiration of pleural fluid for diagnostic purposes is an easy and safe procedure. It should, however, be carried out only when the diagnosis of pleural effusion has been

made with confidence, the diagnosis preferably having been confirmed radiologically. It should not be used blindly to discover whether fluid is present or not. Serious complications often follow the insertion of a needle into hydatid cysts, lung abscesses, and other intrathoracic lesions which might simulate pleural effusion on clinical examination. Whenever doubt exists recourse should be made to accurate radiological diagnosis by postero-anterior and lateral films before aspiration is done.

Apparatus.—Only the simplest instruments are required, and the following should suffice: a 2-ml. syringe; a hypodermic needle, size 17 (B.W.G. 25); a hypodermic needle, size 1 (B.W.G. 21); a 20-ml. syringe; a wide-bore chest-aspiration needle (B.W.G. 16) to fit the 20-ml. syringe; sterile containers; sterile 2% procaine; swabs; gallipots; sterile towel; cetrimide and surgical spirit or iodine; and surgical tape or collodion. The needles should fit the syringe nozzles exactly. The connexions must be airtight. The wide-bore aspiration needle should be thick enough to allow withdrawal of pus should this be encountered.

Preparation of Patient.—Diagnostic tap is an almost painless operation and usually no premedication is required, but a patient who is unduly anxious or who has a persistent cough should have $\frac{1}{4}$ gr. (16 mg.) of morphine half an hour beforehand. He should be placed in a posture which is comfortable to himself and convenient to the physician. A patient who is well enough may sit forward in bed with the knees flexed, the arms folded in front with the elbows resting on the knees and the head resting on the forearms (Fig. 1). The legs should be freed from the weight of the bedclothes to allow the knees to bend, since it is uncomfortable to lean forward with the knees straight. A patient who is not so well should be propped forward on a bed-rest or supported at the shoulders by an assistant.

Site of Aspiration.—In large effusions the best site for aspiration is in the ninth intercostal space in the posterior axillary line. The tip of the scapula, which lies over the seventh rib, is the most useful landmark in finding the right intercostal space. In smaller or localized effusions the needle should be inserted over the area of maximal dullness to percussion, but in such cases radiological location of the effusion should be carried out whenever possible. Lateral radiographs often show that an effusion is localized in the posterior part of the thorax in the paravertebral gutter, and in such cases aspiration should be carried out near the vertebral border. The radiographs of a patient with a posterior pleural effusion are shown in Fig. 2. It is clear that exploration in the posterior axillary line in such a patient would be fruitless, since the needle would pass in front of the effusion.

Technique of Pleural Tap

A wide area of skin around the site of operation is cleaned with cetrimide and iodine or surgical spirit. The 2-ml. syringe is then filled with 2% procaine and, using the size 17 hypodermic needle, a small bleb is made under the skin at the elected site of aspiration. The needle is then withdrawn, removed from the syringe, and replaced by the size 1 needle. After waiting about two minutes for the local analgesic to take effect

FIG. 1.—Position for pleural tap.

FIG. 2.—Radiographs of patient with posterior pleural effusion.

the deeper tissues are anaesthetized by injecting 2% procaine through the size 1 needle, which is advanced slowly until it is felt to pierce the parietal pleura. Not more than 2 ml. of procaine is required for this. The needle is then withdrawn and a further few minutes allowed for full analgesia to develop. The wide-bore needle is then attached firmly to the 20-ml. syringe, and the syringe tested by making sure the plunger moves freely up and down the barrel. With the syringe held firmly, the aspiration needle is pushed slowly but steadily through the intercostal space. During this procedure it is often helpful to rest the forefinger of the operating hand against the chest wall and to rest the flexed middle finger half-way down the needle (Fig. 3). This guards against the needle being thrust too deeply into the thorax when the skin resistance is suddenly overcome. A distinct "give" is felt when the needle pierces the pleura. The plunger of the syringe is then pulled back and the syringe filled with 20 ml. of pleural fluid. The aspiration needle is then withdrawn from the chest wall, and a small piece of gauze or wool is placed over the needle-hole with the other hand.

The pleural fluid is immediately transferred to the sterile specimen bottle before the fluid has time to clot. A small dressing is applied to the chest over the site of aspiration by means of adhesive tape or collodion. The specimen is labelled and dispatched without delay. Difficulty is seldom encountered except when there is a grossly thickened pleura or sometimes when the pleural space contains blood clot or thick pus. If fluid is not obtained easily the needle should be withdrawn and not be pushed forward aimlessly into the chest, since this entails risk of complications. The usual causes of difficulty are faulty choice of site or mistaken diagnosis. Failure to withdraw fluid should lead to

FIG. 3.—Introduction of the aspiration needle.

FIG. 4.—Pericardial tap.

careful reconsideration of these simple matters and not to adventurous blind exploits into the thorax. Performed in this way pleural tap carries little or no risk. Pleural shock is never encountered. Care should always be taken to avoid introducing air into the pleura.

Pericardial Tap

Although large pericardial effusions may be easy to diagnose and safe to aspirate, small effusions are extremely difficult to recognize with certainty and their aspiration is fraught with difficulty. Even with full radiological and cardiographical facilities small pericardial effusions may be difficult to differentiate from cardiac enlargement. Diagnostic pericardial tap is therefore of very limited application in general practice.

Pericardial effusions may be aspirated from in front by inserting a needle through the chest wall, or from below by approaching the pericardium from the costal angle. The second method is preferable because it gives access to the most dependent part of the pericardial sac, where small effusions first gravitate, and also because it is free from the risks of injuring and infecting the pleura, to which the anterior approach is particularly prone. The subcostal approach, which is both easier and safer, should be the method of choice.

With the patient sitting upright and propped comfortably on pillows the gap between the xiphoid process and the left costal margin is palpated, and the skin in this area infiltrated with 2% procaine. The deeper structures are then anaesthetized. A wide-bore needle with a sharp edge but a blunt bevel is securely attached to the 20-ml. syringe, and the pericardium is explored by pushing the needle steadily and firmly from the left subcostal angle. The needle is directed upwards and backwards and slightly towards the midline (Fig. 4). As the pericardium is entered a sudden fall of resistance is felt. Then 20 ml. of pericardial fluid is withdrawn and transferred to a sterile container. The risk of injuring the heart muscle in pericardial tap has often been exaggerated. If the needle is pushed too far a distinct grating can be felt as soon as the needle-point touches the contracting heart muscle. If the needle is withdrawn slightly when this is felt, no damage will be done. Even with greatly dilated hearts, where confusion with pericardial effusions is most likely to arise, it is easy to feel when the heart wall is touched, and the danger of rupturing or penetrating the heart wall is extremely remote.

Peritoneal Tap

Aspiration of ascitic fluid for diagnostic purposes is not commonly practised, since the information gained thereby is seldom of much help in clinical diagnosis. Physical examination is of paramount value in diagnosing the cause of ascites. If, however, peritoneal fluid is required for examination it can readily be obtained by inserting a needle through the abdominal wall. Before aspiration is attempted, two fundamental precautions must be observed. First, it is essential that the patient's bladder should be empty, and to avoid any risk of injuring the bladder-wall it is safer to catheterize the patient. Secondly, in the female a pelvic examination should be done to exclude as fully as possible the alternative diagnosis of ovarian cyst, which so often resembles ascites.

The best site for aspiration is a point midway between the umbilicus and the anterior superior spine of the ileum. When this point is found, the skin and deep structures are anaesthetized with 2% procaine. A wide-bore needle attached to the 20-ml. syringe is then plunged firmly through the abdominal wall and 20 ml. of fluid withdrawn and transferred to a sterile container.

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