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A SIMPLIFIED TECHNIQUE FOR THE TREATMENT OF SIMPLE PLEURAL EFFUSIONS

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PATIENTS suffering from end stage disease of the liver and those who have recently undergone orthotopic transplantation of the liver often develop large pleural effusions. These effusions are almost always transudates, rarely containing blood or pus (1). These patients can experience respiratory embarrassment secondary to these effusions and prompt treatment is essential. Unfortunately, these effusions rapidly reaccumulate after simple thoracentesis. In the past, our approach has been repetitive thoracentesis or the placement of a small chest tube. However, as the number of hepatic transplants and transplant candidates grew, it became obvious that neither of these procedures proved entirely satisfactory.

TECHNIQUE

Since the early part of 1984, we have used a technique developed by one of the authors for dealing with uncomplicated pleural effusions. The technique is a further modification of the Seldinger technique for placement of the central venous catheter (2). After confirmation of the presence of a significant pleural effusion, usually through the use of decubitus roentgenograms, the patient is placed in either the standard sitting position (as for routine thoracentesis) or, if unable to sit, allowed to remain in the supine position. In the sitting position, the upper level of the effusion is determined by percussion and a site one or two intercostal spaces below this is selected and marked in the posterior axillary line (this prevents the patient from lying on the tube). In the supine position, the eighth or ninth intercostal space is selected, again in the posterior axillary line. From this point, the technique is identical for both positions. After appropriate preparation of the skin and sterile draping of the area, local anesthesia (usually 1 per cent Xylocaine® [lidocaine]) is infiltrated and a No. 18 gauge, 20 inch intravenous catheter is inserted into the effusion space taking care to enter just above the inferior rib. Straw colored fluid should freely return as the plastic sheath is advanced and the needle removed. The return of blood, thick or cloudy fluid or air indicates that the procedure should be terminated and appropriate action taken (immediate roentgenogram of the chest, placement of a standard chest tube or open thoracotomy, if indicated). The syringe is disconnected from the plastic catheter and a 0.035 inch diameter flexible tip wire is inserted through the barrel of the plastic catheter well into the pleural space. The catheter is then removed. A small incision is made along the side of the wire with a No. 11 blade and a 6F pigtail catheter inserted over the wire until the last hole on the catheter is 6 inches into the chest. The wire is removed and the catheter aspirated to confirm its position in the effusion. A three-way stopcock is attached to the end of the pigtail and this in turn is attached to a standard intravenous tubing. The other end of the intravenous tubing is attached to an empty 1 liter intravenous solution bag. The catheter is secured to the skin with a silk suture. The effusion can then either be manually evacuated with a 60 milliliter syringe attached to the vacant position of the stopcock or allowed to empty, by gravity, into the bag which should be positioned below the level of the patient. A roentgenogram of the chest is obtained to confirm the position and to check for pneumothorax.

The catheter remains in place until the output is less than 50 milliliters for 24 hours. In our experience, this ranges from several days to over one week. The patency of the catheter can be checked during this period by simply withdrawing fluid through the stopcock. However, the

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catheter should never be flushed for fear of inducing infection into the pleural space. Bags are changed simply by turning the stopcock to the patient off and placing a new bag on the system. Although rare, occlusion of the pigtail catheter can be treated simply by changing the catheter, using sterile technique, over a wire. Removal of the catheter is done at the bedside and the site is covered for 24 hours with an occlusive, gauze dressing. A roentgenogram of the chest is obtained after removal of the tube.

DISCUSSION

The technique described has a number of advantages, especially in our unique group of patients. The patients we treat often have a profound coagulopathy and extensive venous collaterals along the inner thoracic wall. They are often nutritionally depleted and consequently have very poor wound healing. Repetitive thoracentesis is cumbersome and exposes the patient to an increased risk of bleeding, pneumothorax and infection (3). We have found that the use of chest tubes in these patients results in an unacceptably high complication rate. In addition to the commonly associated complications of chest tube placement (bleeding, pneumothorax and empyema), we have noted that the tube insertion site often fails to heal in the patients we studied, resulting in either continued leakage of pleural fluid or pneumothorax when the occlusive dressing is removed (4, 5).

This system allows for the complete removal of even very large effusions quickly and efficiently and prevents reaccumulation. The system requires little specialized equipment, although the elements must be gathered individually. The tube is well tolerated by the patients who complain of minimal or no discomfort. The lack of need for an underwater seal allows the system to be freely portable and the patient free to ambulate without assistance. This system has proved to be ideal for dealing with these types of pleural effusion and we believe that it might be successfully applied i other patient populations, such as those wit recurrent malignant effusions.

Since we initiated the use of these tubes, we over 50 have been placed and only two complic tions have been noted. One of these was pneumothorax which occurred when the tub was pulled partially out of the chest leaving som of the holes within the chest but the rest outside The other was a hemothorax which occurre secondary to an injury to a large intrathorac venous chest wall collateral. We have, thus fa had no infectious complication nor have we h any pneumothoracies after the tubes have be removed.

SUMMARY

This technique for the drainage of simp pleural effusions is simple, safe and effective. requires little more skill than the ability to pe form a thoracentesis or central venous lin placement. It appears ideal for both the bedridde patient who cannot sit for repetitive thoracentesi and for the ambulatory patient who need not b tied down with a chest tube and underwater sea system. We stress that the system is functiona only for simple transudates and will provide un satisfactory drainage of thick or bloody effusions.

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