Subcutaneous Chest Port Infection

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Implantable venous access devices or ports are generally used for long-term intermittent central venous access such as for administration of chemotherapy. When they are placed by radiologists, procedural complications are quite rare. Infection is less common in ports than in other central venous catheters because the device is buried under the skin. Nonetheless, infections do occur and are the most common complication necessitating port removal. Approximately 5% of patients require port excision because of infection.

COMPLICATION

A 64-year-old man with colon cancer was referred to our vascular and interventional radiology section for insertion of a dual-lumen chest port. The procedure was uneventful, but ~10 days after insertion, the patient noticed redness, tenderness, and induration at the port site. He subsequently developed a fever and was seen in our emergency department for evaluation. Blood cultures were positive for *Staphylococcus aureus*. He was placed on broad-spectrum antibiotics and our service was consulted for further management.

On physical examination, it was apparent that the patient had a pocket infection requiring port removal. The patient was placed in a supine position and the skin overlying the port site was scrubbed with a chlorhexidine antiseptic solution (Fig. 1A). The area from the angle of the mandible to the nipple line on the side of port was cleansed. Radiologists were fully masked and gowned for the entire procedure and observed standard surgical scrub protocol. After subcutaneous administration of lidocaine, an incision was made along the scar overlying the port. When the pocket was entered, the port and catheter were removed as a unit (Fig. 1B). Upon removal of the intravascular portion of the catheter, manual compression was applied for several minutes over the subcutaneous tunnel to avoid air embolism. The entire

device was sent for bacteriologic analysis. Device cultures were positive for *Staphylococcus aureus*. The fibrous capsule surrounding the port was not removed.

The pocket was then irrigated with a 1:1 mixture of povidone-iodine (Betadine) and sterile saline while manual compression of the tunnel was performed. Because the wound appeared purulent, iodoform gauze was packed into the incision site (Fig. 1C, D) and was changed daily until the wound appeared clean. Subsequently, saline-soaked gauze was loosely packed into the wound and changed every 2–3 days. The wound was allowed to heal by secondary intention. If signs of pocket infection had been absent, our protocol would be to close the incision with 3-0 Ethilon mattress sutures (Ethicon, Somerville, NJ) and place iodophor antibacterial ointment on the skin incision site. The patient continued his antibiotic therapy and was seen in clinic on postprocedure days 1–3 with sutures removed after 2 weeks.

DISCUSSION

To provide excellent care in the area of central venous access, it is incumbent for radiologists to demonstrate willingness and proficiency in the management of complications. Although infrequent, infections are the most common complication requiring chest port excision, and the management of port infections is an important, practical problem.

Subcutaneous chest port infections may be divided into two broad categories: pocket infection and systemic catheter-related septicemia. Pocket infection is usually readily diagnosed because of erythema, tenderness, induration, and purulence at the port site. Systemic catheter-related septicemia may be more difficult to recognize, especially in immunocompromised patients, and is generally considered to be a diagnosis of exclusion. In our hospital, patients with suspected catheter-related septicemia are initially treated with broad-spectrum

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Figure 1 Removal of a dual-lumen chest port because of pocket infection. (A) Photograph shows port site. The skin is indurated and was noted to be tender on physical examination. (B) Photograph obtained after sharp dissection shows purulence in the pocket. (C) Photograph shows iodoform gauze packed into pocket. (D) Photograph after port excision shows gauze packed into the pocket. The wound will heal by secondary intention.

antibiotics. If this is unsuccessful and no other sites of infection can be found, ports are removed, regardless of local signs or symptoms. Raucher et al reported using quantitative blood cultures to determine whether a catheter is infected by obtaining simultaneous blood samples from the catheter and a peripheral site. If colony counts from the device are more than 5 to 10 times those of the peripheral blood, the catheter is established as the site of infection.

When we began inserting chest ports several years ago, we had limited experience with wound infections. Initially, our surgical colleagues managed all port infections, but they were understandably reluctant to continue this courtesy indefinitely. We gradually assumed this responsibility and discovered that there was no general consensus among surgeons regarding treatment of patients with suspected port infections, particularly with regard to those who did not exhibit local signs of infection. Moreover, we could find no studies addressing this question. Although port removal is generally straightforward, a dilemma facing physicians when removing an infected access device is wound closure.

Primary closure is performed when uninfected ports are removed because wounds treated in this manner generally heal quickly with good cosmetic results. However, if a wound is infected, closure of the contaminated subcutaneous pocket may lead to cellulitis or abscess. In general, most infected wounds are best managed with open drainage.

Initially, we treated all patients with suspected port infections conservatively with open drainage regardless of local signs or symptoms. All patients with pocket infections continue to be treated in this manner. Open drainage entails packing the wound with iodoform gauze daily for several days followed by sterile saline-soaked gauze every 2–3 days for up to 2 weeks. The wound slowly heals by secondary intention. This practice is more time consuming and labor intensive for both patients and physicians compared with primary closure. Plastic surgical consultation may be necessary in some patients with poor cosmetic results.

Subsequently, we began closing port pockets that exhibited no local signs of infection. We reasoned that because all wounds contain some bacteria, all are

“contaminated” to some extent. Also, Robson et al note that a wound can usually tolerate contamination of up to 100,000 organisms per gram of tissue (with the exception of streptococci) and still be closed successfully without infection. Although exact quantitation of infection is impossible by visual inspection, in practical terms, when pain, redness, purulence, and induration are absent, port excision and wound closure (in conjunction with antibiotic administration) appear to be safe and well tolerated in patients with device-related septicemia. This is true in our experience even when the device is the source of infection. This practice simplifies follow-up wound care and provides acceptable cosmetic results.

SUGGESTED READINGS

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