

Don't Use That Port: Insert a PICC

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The Case

A 48-year-old woman receiving neoadjuvant therapy for breast cancer was admitted to the hospital with fever and abdominal pain. A computed tomography scan in the emergency department revealed acute appendicitis and surgery was recommended. Although the patient had a chest port in place, the surgeon refused to access the port, and instead requested placement of a peripherally inserted central catheter (PICC). The surgeon believed that the port device should be exclusively used for chemotherapy, not to provide venous access for other purposes; he felt strongly that such use would increase the risk of infection. Although the vascular access nurse disagreed and advised that the port should be used for vascular access during surgery, the surgeon ordered PICC insertion by interventional radiology. The patient underwent a complicated PICC placement requiring multiple insertion attempts and adjustments. The next day, she developed severe arm pain and swelling and was found to have an acute deep venous thrombosis (DVT) involving the axillary and subclavian veins on the side of the PICC. Surgery was canceled, and she was placed on anticoagulation therapy and managed conservatively for appendicitis. The patient ultimately recovered but only after significant complications including contained perforation, peritonitis, and prolonged hospitalization (in addition to the blood clots).

The Commentary

This case raises questions related to three different issues: (i) the evidence for safe utilization of implantable central venous ports, (ii) teamwork and decision-making among interprofessional teams, and (iii) the accountability and culpability of health care providers in safety incidents.

Implantable central venous ports (ICVPs) are used regularly, predominantly in patients with cancer, to allow convenient and reliable intravenous access. ICVPs can be accessed to obtain blood samples and to administer various medications, fluids, and blood products.⁽¹⁾ Complications of ICVPs are uncommon and include local and systemic infection, occlusion, deep venous thrombosis (DVT), and catheter separation and migration.⁽²⁾ Risk factors for ICVP-related infection include poor patient performance status, increased catheter utilization days, specific types of cancer (e.g., pancreatic), parenteral nutrition, and preexisting

sepsis.(3,4) Appropriate post-placement care is widely promoted, although evidence is lacking, and controversy exists regarding the safety of different ICVP access and maintenance techniques.(5) However, compared with all other available intravascular sites and devices, including peripheral venous catheters, ICVPs carry the lowest risk of infection.(6,7) There are no data comparing the incidence of ICVP-related infection during acute hospital admission versus outpatient care. The most recent Centers for Disease Control and Prevention guidelines for the prevention of intravascular catheter-related infections are relatively silent regarding ICVP access or risks in different care settings.(8)

Because both malignancy and surgical procedures are known independent risk factors, it appears that the patient described in this case had substantial risk for DVT. The reported incidence of symptomatic DVT complicating ICVP ranges between none and 4.8% (7,9), whereas the incidence for PICCs has been reported at 3.0% for mixed populations of hospitalized patients (10), and as high as 5.6% for patients who received a PICC for chemotherapy.(11) It is reasonable to assume that the concurrent presence of two different central venous devices would increase the likelihood of DVT. It is not clear whether this risk was considered by any of the team members prior to making the decision to insert a PICC.

It appears, therefore, that simply accessing the patient's existing ICVP and not inserting an additional intravenous catheter would have been the safest strategy. The likelihood of infection would have remained lower than any alternative, and the additional risk for DVT would have been avoided. The mindset that ICVPs should be reserved exclusively for chemotherapy is not based on any evidence.

In this case, a highly questionable decision of one team member trumped the legitimate views of another, and opportunities for recovery down the road were missed. We cannot comment on the surgeon's perspectives, knowledge, or experience, and to what extent these influenced his opinion. Since he was certainly in a position of power, his disagreement with the nurse's suggestion was sufficient to bring any further discussion to a halt. In return, it appears that the vascular access nurse did not have the necessary tools to engage the surgeon in a genuine discussion regarding the risks and benefits of different strategies. The interventional radiologist seemed removed from the discussion and had no apparent influence over the plan apart from performing the procedure. The patient, understandably, voiced no opinions throughout the unfolding of events.

Better communication and shared decision-making within this team might have led to better results. The effectiveness of health care teams can have direct impact on patient outcomes. However, the performance of teams is often poor due to well-established hierarchies and various sources of conflict among health care professionals.(12) High performing teams focus on communication, coordination, and cooperation (13), and training programs such as TeamSTEPPS are available to improve team behavior.(14) Yet, such programs are not fully and reliably integrated into multiprofessional education programs and health care organizations. A surgeon trained in team leadership skills such as conflict resolution might have listened more carefully to the vascular access nurse. A nurse versed in communicating safety concerns may have conveyed a more effective message. An educated patient, as well as an actively involved interventional radiologist (one who participated in devising—not just executing—the plan for intravenous access) would have likely influenced the decision. High-quality teamwork may have resulted in avoidance of the unnecessary procedure and a more favorable outcome.

The surgeon's actions and decisions, if lacking evidential support, surely originated from sincere concern regarding the wellbeing of his patient. Assuming no previous exposure to advance teamwork training, it is not surprising that none of the team members did a good job in challenging the surgeon's decision and averting the error. Therefore, although the surgeon certainly made a mistake, this is a clear case of a blameless act.(15)

Although personal remedial measures may not be called for, several actions should be taken following this harmful safety incident. First, an appropriate disclosure process should be undertaken and relevant patient, and provider, needs should be addressed. From the patient's perspective, anticoagulation should be continued for 3 months, the PICC should be removed when appropriate (though evidence is lacking regarding the best time to do that) (16), and support should be offered to address relevant physical, emotional, social, and financial needs. The health care providers involved should also be supported as needed to avoid moral distress and to ensure healthy coping with possible guilt and shame they may experience.(17) Second, a debriefing should be performed, including all the involved clinicians, aiming to identify opportunities for improvement. Providing education, recommendations, and tools to patients undergoing ICVP insertion, as well as designing and mandating a collaborative process for ordering interventional radiology procedures, are examples of possible solutions. Most importantly, the organization should endeavor to train its providers to be effective team members.

Take-Home Points

- Accessing an existing implantable central venous port is safe during an acute hospital admission and exposes the patient to less risk than inserting a second device.
- Interprofessional collaboration should be viewed as a key organizational and professional approach to effectively share knowledge and expertise and to establish the best plan for a patient.
- All health care professionals should be trained in teamwork.
- Personal culpability should be demanded cautiously and only in situations where other system-based factors have been well addressed.

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