

# They're not Just Mini Adults

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**Caring for the Pediatric Patient with a  
Central Venous Access Device**





A Central Venous Access Device (CVAD) plays an essential role in the care of medically complex children. Whether a CVAD is needed to administer medication, deliver nutrition, or draw blood, even the most veteran home infusion nurse can experience anxiety when asked to visit a pediatric patient. While many of the practices of caring for a central line are the same for all patients, there are some fundamental differences between adult and pediatric patients that we must take into consideration. This article discusses the various options available for the care, and maintenance of central lines and the challenges associated with managing CVAD in children.

### **Children Are at Greater Risk for Central Line-Associated Bloodstream Infections, or CLABSI, Than Adults**

Their young age, especially less than two to three years old, and their low body weight, especially less than eight kilograms, contribute to an increased risk of infection. Long-term parenteral nutrition, often prescribed for children with short bowel syndrome, is also a risk factor. In fact, short bowel syndrome is the single strongest predictor for bloodstream infection in children. In addition, children with cancer and/or stem cell

transplantation are at greater risk of infection and those requiring parenteral nutrition have a 40-fold increase in CLABSI, regardless of central venous catheter type.<sup>1</sup>

Prevent infection by using aseptic technique every time you access the catheter. No exceptions. Perform a 15- to 30-second scrub to the catheter hub before each access.

### **Children Have Sensitive Skin**

Use an appropriate skin prep during dressing changes. Two percent chlorhexidine gluconate with 70 percent isopropyl alcohol (CHG) is the skin prep of choice. Alternatives include tincture of iodine and 70 percent alcohol. Recommendation cannot be made for use of CHG on infants less than two months of age: issues of skin integrity compromise, notable skin irritation, and systemic absorption of CHG have been documented.

Always allow any skin prep to dry **completely** before applying a transparent dressing to the central venous catheter. Failure to do so can create irritation around the catheter insertion site, which can contribute to bloodstream infection. While this is also true with adults, it is even more true with children because their skin is more delicate than adult skin. Use specialized dressings and no-sting barrier film to prevent skin irritation.

**Children as young as three or four years old with chronic conditions requiring long-term intravenous (IV) therapy can run out of available sites for CVAD placement. The loss of a pediatric central line can have devastating consequences for these small patients.**

### **Pediatric Patients Often Have Limited Vascular Access Sites**

Our goal with pediatric patients should be to salvage the central line whenever possible. Children as young as three or four years old with chronic conditions requiring long-term intravenous (IV) therapy can run out of available sites for CVAD placement. The loss of a pediatric central line can have devastating consequences for these small patients.

We need to take extra precautions to protect the CVAD from accidental dislodgement. Exit site location should be carefully considered prior to catheter placement based on the age of the child, gross motor development, and a history of displaced catheters (which presumes repeated manipulation or tugging at the catheter). Some catheters are tunneled posteriorly to the scapula to prevent catheter manipulation by the patient.<sup>1</sup> Once placed, consider the use of a low-profile engineered stabilization device to secure the catheter. Cover the external portion of the catheter with mesh. With children, out of sight is out of mind. Make sure the child cannot see it; she/he may become curious and play with it. Be sure to secure the needleless connector in a manner that keeps it out of small children's mouths and diapers.

Depending on the type of CVAD, line repair is preferred to removal and replacement when possible. Catheter repair is especially effective on tunneled catheters.

### **Pediatric Patients Are More Likely to Have Catheter Occlusions Than Adult Patients**

Longer survival of chronically ill children has led to the repeated need for prolonged central venous access. Small gauge catheters are prone to complications, including infection, catheter-related thrombosis, phlebitis, malposition, and occlusion.<sup>2</sup> Studies show occlusions in up to 36 percent of CVCs within two years of placement for adults and children.<sup>3</sup> Among neonates, occlusion rates have been reported as high as 66 percent within 110 days of placement.<sup>2</sup>

Catheter sizes for children range from 1.1 to 7-French and are based on age, weight, vessel size, insertion site, and the type and length of the prescribed therapy. In children, the catheter occupies a larger proportion of the blood vessel than in adults. Consequently, blood flow around catheter may be much slower, thus increasing risk of fibrin formation.

Appropriate vein and catheter size selection is key to promoting vein salvation, minimizing the number of venipuncture attempts, pain, and anxiety<sup>2</sup> and minimizing trauma to the vein while the catheter is in place.

Children with cancer requiring parenteral nutrition have a ten-fold increase in occlusion, regardless of CVAD type.<sup>1</sup> These occlusions are generally thrombotic in nature. Certain antithrombolytic proteins are decreased (for example, plasminogen and plasmin) and prothrombotic proteins are increased (for example, plasminogen activator inhibitor-1) in neonates compared to adults. As a result, overall fibrinolytic activity may be depressed.<sup>4</sup>

Occlusion prevention strategies include strict adherence to flushing protocols (using normal saline, heparin, or urokinase) to maintain patency,<sup>1</sup> use of the push-pause (also called intermittent positive pressure) technique, ensuring chemical compatibility of drugs to prevent precipitate formation, and slow, continuous heparin infusion for catheters less than 26 gauge.

# They Wiggle & They Cry

Intrusive health care procedures can have a profound impact on a child's psychological sense of well-being and ability to cope with current and future health care experiences. Studies show that such experiences can have long-lasting effects, from months to years.<sup>5</sup> Children have limited cognition and life experiences and they

possess fewer coping abilities when faced with unfamiliar and potentially frightening situations. Some hospitals have developed pain management protocols for use with children during procedures, such as the Children's Comfort Promise Program at Children's Hospitals and Clinics in Minnesota.<sup>6</sup>

## ***Here Are Some Suggestions to Help Your Visit Go Smoothly and Minimize Negative Impact.***

### ***Prepare the Child for the Procedure.***

Clarify what is going to be done, when, where, how, and why, as well as the benefit that will be derived. Helping the child understand what's happening can help prevent the child's misinterpretation or misperception that the procedure is a punishment for some imagined wrongdoing. Communicate at a developmental level that facilitates the child's understanding.

### ***Share Stories About What Other Children Have Said About the Experience.***

This can help frame the information in a way the child can understand. Use softened terms to prevent fear and worry (for example, call a surgical incision an opening rather than a cut). Use minimally threatening language. For example, say, "Some children say they have a warm feeling when this medicine is given. What do you feel?"



## **Use Props, such as Photos, Dolls, Demonstrations, and Rehearsals.**

Depending on the child's age, having extra medical supplies, such as an empty syringe for them to "help" you administer medicine, gives them a small sense of control during the procedure. Encourage questions, watch for nonverbal reactions, and give them opportunities to demonstrate understanding.



## **Agree upon a Plan with all Caregivers and Family Members Ahead of the Procedure.**

Who will be present? Who will be the coach? What coping strategies, like distraction, breathing, or relaxation, will be used? Having a cohesive plan helps to instill confidence and prevents a chaotic environment, especially if tensions run high during the procedure. For example, when multiple people try to coach, the child can easily become overwhelmed. Use a single person for guiding and supporting the child through the procedure in a calm and reassuring manner.

## **Have Parents Present for the Procedure.**

Even though nurses are often reluctant to have parents present, 99 percent of children stated that having their parents with them provided the most comfort when in pain.<sup>5</sup> That said, when you're utilizing parents to hold the child, make sure they understand that they must hold the child still during the entire procedure, and the dangers associated with them letting go. The benefit of their presence must be weighed against their capacity to perform the task given to them. Evaluate the parents and assign them a role that is appropriate for their skill level. Sometimes their presence is enough; sometimes they are the very best person to hold the child.



## **Use Supportive Positioning.**

Children feel more vulnerable and less in control when they are forced to lie down for a procedure. Often, they struggle to sit up which leads to them being restrained by staff, which increases stress and trauma. Comfort holds, such as being held on a parent's lap, allow children to remain seated without the use of aggressive restraint measures.



## **Use Topical Anesthetics to Numb the Skin.**

Topical lidocaine and pressure-accelerated sprays can help to decrease pain if used prior to a needlestick procedure. Be sure to leave the product on the skin for the manufacturer-recommended amount of time, often fifteen to thirty minutes.



### ***Do Procedures at the Start of your Visit, If Possible.***

The child knows it's coming, and if you make them wait while you interact with the parents, reconcile their medications, and complete your assessment, their anxiety level increases. Do the essential assessments, the procedure, and then finish with your other assessments and questions for the parents.

### ***Tell the Child when the Procedure is Finished.***

Wait until it's truly done rather than leading them on. Then, you can honestly reassure them that the experience is finished.

### ***Tell the Child the Truth.***

Be honest with the child. For example, you can say, "This will hurt, but only for a moment. It's okay to cry, but you have to hold still." Do NOT betray them by lying to them! It's heartbreaking to see a health care provider tell a child, "This won't hurt," and to see the look of betrayal on their face as they burst into tears. A breach of trust only increases the child's anxiety and can negatively impact future procedures.

***"This will hurt, but only for a moment. It's okay to cry, but you have to hold still."***

As an IV nurse, you have a tremendous impact on your patients, whether they are adults or children. Your conscientious care impacts your patient's outcome in many ways, including prevention of CLABSI and occlusion, which helps avoid potential interruptions of therapy. Other more intangible levels of impact include how patients tolerate their time with a CVAD, how they remember the experience, and potentially how effective their treatment is overall.

Never let anyone tell you the pediatric patient is just a mini-adult. Treating them

as such can have lasting, often negative, consequences. Meeting a child at the appropriate developmental level not only decreases the child's stress and trauma, it can make your job much more satisfying and enjoyable. You may find it broadens your capacity as a nurse — on a technical level and an interpersonal level. The skills you learn to care for children are often transferrable to adult patients. While adults may have developed more coping abilities than children, many of the techniques described in this article work wonders for decreasing their stress levels during procedures.

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