Identifying Experiences Related to Accessing Central Venous Catheters (CVCs)/Central lines for Treatment Infusions and Parenteral (IV) Nutrition (PN)

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Background
On average, 5-million central venous catheters (CVCs) are placed every year in the United States. Caring for CVCs can be stressful as these patients are often critically ill and at increased risk of bloodstream infections. In the United States, over 400,000 bloodstream infections occur each year, (90% CVC related), placing these patients at an increased risk of mortality. For patients receiving repeatable infections, such as total parenteral nutrition, they will have to care for the CVC and administer infusions at home in the same manner as a trained healthcare professional. Needless claves are often used to provide a secure “screw-lock” connection from the lumen-hub to needless syringes or tubing. For infection control purposes, it is recommended that claves and administration sets are changed at regular intervals. However, guidelines are lacking on how to mitigate the challenges that arise when the connection between the clave and lumen-hub seizes, making it difficult to change the clave. This has led to the utilization of workarounds which occur both in hospitals as well as in-home settings. But for patients and caregivers, the problem is intensified by the lack of resources available to them at home.

Objectives
To present results from an effort to design a CVC-specific tool to address challenges in order to i) mitigate the use of workarounds and ii) lead to further improvements to CVC safety protocols when caring for patients with CVCs in both hospital settings, as well as at-home environments.

Methodology
We used selective sampling to recruit nurses at UNC with the required CVC skills. We worked with the Oley Foundation Research Committee, a national non-profit organization for those living with CVCs, to recruit patients and caregivers for focus groups. We utilized gift cards for recruitment incentives. We surveyed 19 nurses and conducted 2 focus group sessions with 2 nurses, 8 patients, and 2 caregivers. Of the 8 patients that participated, the mean (range) time with a CVC was 10.2 (2-37) years. All focus group data was synthesized and coded (see Qualitative Analysis).

Results
Survey: 25 nurses responded to our call for participation (10% response rate), and 19 completed all survey items. All the nurses indicated their profession as either a BSN (9) or RN (10). Nurses’ specialty areas included Imaging (7), Radiology (6), Critical Care (4), Oncology (1) and Bone Marrow Transplant (1). The majority experienced challenges, but interestingly, only 8 (42.1%) nurses felt they had been provided ample training on what to do if unable to remove the clave. While hemostats are used to resolve this problem, they are also strongly discouraged in practice, as they have caused breaks with both the needless claves and CVCs. Considering these concerns and risks, almost half of these nurses felt stressed 9 (47%), felt the patient is stressed 8 (42%) or felt the caregiver was stressed 8 (42%).

Focus Group: 27 people responded to participate, and 16 completed the consent form, of which the majority were patients (n=10), followed by nurses (n=4) and caregivers (n=2). Of the 8 patients that participated, the mean (range) time with a CVC was 10.2 (2-37) years. All focus group data was synthesized and coded (see Qualitative Analysis).

Conclusions
• This study identified experiences of patients, caregivers and nurses related to accessing CVCs for infusion therapies.
• Our findings provided substantial evidence that removing claves from lumen hubs can present challenges that are often attributed to overtightening the clave or from residue (blood, medication, etc.) building up around the lumen hub.
• While overtightening was noted as a contributor to this problem, both patients and nurses raised concerns that under tightening could result in the clave not staying on, leaving patients exposed to infection risk.
• When challenges arise, medical instruments and supplies are used both for in-patient and at-home resolution. For patients, these challenges often result in a sense of hypervigilance, and lack of independence, as their previous experiences have resulted in bloodstream infections, time in hospital, or time spent traveling to hospital (nearest hospitals for some are 3-5 hours away).
• Formal training is lacking with the majority indicating they have not been trained on how to appropriately remove the clave when challenges arise, relying mostly on ad hoc training to mitigate these challenges.
• Overall, developing a tool to mitigate these challenges was well received.

Future Work
Future research includes evaluation of CVC training materials, and conducting usability testing of novel design concepts, in collaboration with nurses, patients and caregivers.

Qualitative Analysis

Categories
- Emotional Wellbeing
- Mental Wellbeing
- Successful approaches without tools

Subcategories
- Trust with others
- Carefulness
- Fear with others
- Anger & Frustration
- Requires grip strength
- Not overtightening

Codes
- Broken CVCs
- Bloodstream infections
- Hemostats/clamps
- Medical gloves/tourniquets
- Non-medical supplies
- Broken CVCs
- Bloodstream infections
- Distance from hospital
- Inability to dry cuffs

Tangible Experiences
- Professional training
- Disinfection techniques
- Scrubbing & drying times
- Medical instruments/supplies
- Caregiver responsibility

Ad-hoc training
- Google search
- Experienced nursing staff
- Support groups

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