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Human Factors Development of Communication Tools for Stollery Children's Hospital Hematology Program Venous Access Device Use

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Summary

Occasionally, pediatric hematology patients may require an implanted venous access device for the purposes of apheresis (Vortex Port). As this is an uncommon use for such a device, the interaction with the device is a departure from standard procedure. Clear communication tools are required to ensure the interaction with the device occurs in a proper manner so as to not compromise the patient's safe care. A human factors design approach resulted in the development of communication tools that followed principles of information design and assist in communicating the a) patient's condition, b) rules for the accessing implanted device, and c) guidelines to follow when accessing the implanted device. These principles included[1]:

Human Factors Principle	Description	Example
Making important information accessible	Having key pieces of information at hand when being used to make a decision.	The checklist was designed to be used as a tool at the bedside and specially designed to highlight the change from standard procedure when accessing the Vortex Port
Making use of familiar symbols and terminology	The use of familiar symbols and terminology make it easier for the end user to follow instructions outlined on the various communication tools	The heparin label made use of the word stop (a standard alerting word) and octagon symbols (acknowledged symbol for stop).
Using top down processing	Because people follow processes in a manner that follows their familiarity or expectations, the use of a tool such as a checklist requires that deviations need to be adequately highlighted.	The checklist highlighted pauses in the processes to encourage end users to be thoughtful and mindful of the process as it was a deviation from standard practice
Including redundancy gain	When care conditions are inconsistent and less than ideal, end users benefit from the information being presented in a variety of ways	Because this patient could be treated by a variety of care providers, at a variety of facilities, different tools were designed to ensure that information is best communicated and reinforced through a variety of means
Replacing memory with visual information	In the care of patients, it is better to also have information available for reference rather than solely relying on information that the care provider retains through memory	The design of the heparin sticker, and including specific care related information on the bracelet and card allow care providers a reference for information to confirm the information in their memory. In particular, because of the departure from standard practice (draw blood then flush with heparin), this information was best presented as a reminder through the checklist

[1] Wickens, C., & Gordon, S. (2004). *An introduction to human factors engineering* (2nd ed.). Upper Saddle River, N.J.: Pearson Prentice Hall

Designing with human factors principles promotes greater uptake and continued use of the tools. The final version of each communication tool is demonstrated below.

Medical Alert Bracelet and text for engraving

Vortex Port/IVAD in Chest
DO NOT ACCESS

Front:
Vortex Port/IVAD in Chest
DO NOT ACCESS

Back:
Patient Name
Sickle Cell Disease

Patient Information/Wallet Card

Health Information Card

Patient Name:_____
Diagnosis: Sickle Cell Disease

Central Vortex dual ports in chest
DO NOT ACCESS these ports

Contact Stollery Children's Hospital
Pediatric Hematology Service 780 407 8822

Heparin Warning Label

STOP

HIGH Concentration Heparin

Vortex port SCC required to proceed

Care provider checklist

Vortex Port Access Checklist

Gather all necessary equipment and supplies

1

- ☐ Assess site for complications or infection
- ☐ Aseptically clean the site

PAUSE

Allow site to dry

2

- ☐ Access the medial **port** with the **needle**
- ☐ Twist Cap **counter clockwise** 
- ☐ **Advance** needle using ridges to the back of port
- ☐ Repeat above steps with the lateral port

PAUSE

3

Instruct patient to **HOLD THEIR BREATH**

Remove the needle trocar quickly, and quickly attach primed 1mL extension tubing and cap on medial port

PAUSE

Patient can now breathe normally

4

Repeat step **3** with the lateral port

CRITICAL STEP

5

With empty syringe withdraw and discard 3mL of blood from each port

PAUSE

6

Flush with 20mLs normal saline then, proceed with orders