Venous Needle Dislodgement In Patients on Hemodialysis

Billie Axley  
Joan Speranza-Reid  
Helen Williams

Hemodialysis treatments have become routine, but complications still occur, ranging from the most common (headache, cramps) to the less frequent yet more serious complication of substantial blood loss related to venous needle dislodgement (sometimes abbreviated as VND). Venous needle dislodgement happens when the venous fistula needle becomes dislocated out of the vascular access, resulting in blood loss. This can lead to a rapidly declining blood volume in the patient and may cause morbidity and mortality if not discovered quickly. At typical hemodialysis blood flow rates of 400 to 500 mL/minute, it can take only minutes for the patient to lose over 40% of his or her blood volume (the point at which hemorrhagic shock occurs) (Gutierrez, Reines, & Wulf-Gutierrez, 2004). In a scientific abstract presented at the 2008 American Society of Nephrology (ASN), Sandroni, Sherockman, Joan Speranza-Reid, BSHM, RN, CNN, is Director of Renal Services, CVPH Medical Center, Plattsburgh, NY, Hemodialysis Special Practice Network Facilitator for ANNA, and a member of ANNA’s Northeast TriState Chapter.

Helen Williams, MSN, RN, CNN, is an Assistant and Special Projects Manager, Denver Acute Dialysis, Fresenius Medical Care, Denver, CO, Commissioner the Nephrology Nursing Certification Commission, and a member of ANNA’s High County Chapter.

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and Hayes-Light (2008) reported from a study involving 300 patients an observed incidence in their hospital system of one catastrophic hemorrhage resulting from venous needle dislodgement per 126,718 treatments. The authors indicated if the annual incidence of such events nationally was similar to the incidence they observed, it could be estimated that over 400 events occur annually in the United States (Sandroni et al., 2008).

**Background**

Venous needle dislodgement has been described as “...a potentially life-threatening complication of dialysis...” (Hurst, 2011a, p. 148). An advisory from the Pennsylvania Patient Safety Authority (2010) indicated that 32 event reports involving needle disconnections were received during a one-year period from November 1, 2008, through October 31, 2009. These submitted events represented 6.1% of all hemodialysis events reported to the Pennsylvania Patient Safety Authority during that period. These data were limited to reports from hospital-operated dialysis facilities (Pennsylvania Patient Safety Authority, 2010). A Patient Safety Advisory from the U.S. Department of Veterans Affairs (VA) in 2008 reviewed 47 root cause analyses and safety reports received from March 1, 2002, to April 30, 2008, that concerned bleeding episodes during the hemodialysis treatment. In this analysis, the 47 reported patient events “...involved dislodgement of the venous needle or disconnection of the venous bloodline at the dialysis catheter attachment” (Veterans Health Administration, 2008, p. 3). In its 2006 End Stage Renal Disease (ESRD) Patient Survey, the Renal Physicians Association (RPA) (2007) found that 5.1% of the 1056 patients responded positively when asked if the needle had ever, in the last three months, come out of their access site before their dialysis treatment was finished.

Saibu and colleagues (2011) reported a patient death resulting from venous needle dislodgement and advocated for staff and patient education concerning the importance of keeping the patient’s access visible at all times. Education of all nephrology/dialysis staff and patients on dialysis on prevention of accidental line separation and venous needle dislodgement were promoted as a “top priority during hemodialysis” by Saibu and colleagues (2011, p. 515).

The risk of complications from venous needle dislodgement is magnified by dislodgements that do not trigger a venous pressure alarm to alert patient care staff or the patient (Sandroni et al., 2008). Venous needle dislodgement during hemodialysis without triggering a venous pressure alarm was reported in an online medical device safety report from 1998 that described “...the back pressure created by the narrow-bore needles prevented the machine’s venous pressure monitors from sensing the loss of pressure created by the dislodgement” (ECRI Institute, 1998, p 1). The report continued to say that even if the venous needle is fully or partially dislodged from the patient, the venous pressure monitor is likely to continue sensing the pressure created by the needle’s flow resistance. The conclusion of the ECRI Institute report indicated that although the venous pressure monitor may be able to reliably detect a large pressure change, needle flow resistance makes it “unlikely” for the monitor to detect the smaller drop in pressure associated with needle dislodgement (ECRI Institute, 1998). In addressing undetected venous needle dislodgement, the ECRI Institute (1998) stated the problem was not unique to any specific brand or model of hemodialysis machines or tubing sets. The VA, in its Patient Safety Advisory on bleeding episodes during dialysis, found similar general information from the majority of its analyzed events. There was no statistical difference between the incidence of complications and the brand of dialysis machine involved in their analysis (Veterans Health Administration, 2008).

Consequences of a venous needle dislodgement event can range from minimal blood loss to a fatal hemorrhage (Pennsylvania Patient Safety Authority, 2010). In its analysis of reports of bleeding during dialysis, the VA National Center for Patient Safety found that 40 of the 47 events were termed “serious bleeding episodes” (Veterans Health Administration, 2008, p. 1) (which they defined as more than 100 mL), many of which “required hospital admission and some resulted in death of the patient” (Veterans Health Administration, 2008, p. 3). A series of articles directed to the public concerning safety in dialysis by Fields (2010) included an article that related the story of a patient on dialysis who “never really recovered” from a loss of blood from her venous “tube” and spotlighted the event as a “catastrophic hemorrhage during treatment” (p. 2). Fields (2010) also reported that ProPublica examined records for more than 1500 dialysis clinics in five states from 2002-2009 and found at least one fatality that resulted from needle dislodgements in each of the five states plus “dozens of additional cases in which patients required hospitalization, blood transfusions, or other emergency interventions” (p. 4). Fields (2010) also described the compelling physical and psychosocial suffering of five patients on hemodialysis and their families due to line separations, needle dislodgement, and staff error that resulted in significant blood loss during a dialysis procedure. Hurst (2009) has advocated that just as fire drills are practiced and smoke detectors are used to prevent harm, the healthcare community must learn from past venous needle dislodgement incidents, be vigilant, and use available technologies to provide safe care.

**ANNA Venous Needle Dislodgement Special Project Workgroup**

The American Nephrology Nurses’ Association (ANNA) convened a collaborative special project workgroup, the ANNA Venous Needle Dislodgement Special Project Workgroup, to
review recommendations of care for venous needle dislodgement prevention and detection, and to present these recommendations in easy-to-use tools. A literature review was performed for occurrences and consequences of venous needle dislodgement and to identify best practice recommendations for prevention of venous needle dislodgement. To gather information from nephrology nurses on the occurrence and implications of venous needle dislodgement in the hemodialysis population, the ANNA Venous Needle Dislodgement Special Project Workgroup developed the ANNA Venous Needle Dislodgement Survey and distributed it to the ANNA nephrology nurse membership. Questions included in the survey were:

- Identification of practice area.
- Have you seen a venous needle dislodgement in the past five years?
- How often are you concerned about venous needle dislodgement?
- Would a screening tool assist you in the assessment of a patient’s risk of venous needle dislodgement and be of benefit to you?
- Would educational material on how to reduce the risk of venous needle dislodgement be of benefit to you?
- Please share additional comments about venous needle dislodgement.

**ANNA Venous Needle Dislodgement Survey Results**

Responses were received from 1173 nephrology nurses. Over 70% of respondents reported they practiced in chronic hemodialysis and 43.1% in acute care (the percentages exceeded 100% because respondents were asked to identify all areas in which they practice) (see Table 1). The ANNA Venous Needle Dislodgement Survey results revealed that 76.6% (n = 894) of the 1166 responders to the survey question about observances of venous needle dislodgement indicated they had seen a venous needle dislodgement in the past five years, with 8.2% (n = 96) of these having seen five events or more in this time period (see Table 2). Slightly more than half (57.9%) of the 1162 respondents to the question of how often they were concerned about venous needle dislodgement indicated they were concerned about venous needle dislodgement very often or often (see Table 3). An additional 23.1% rated their concern as occasional. Of the 1156 survey respondents to the question about the potential benefit of a venous needle dislodgement risk assessment, 71.2% (n = 823) indicated they would find such a tool to be beneficial. To the question about the benefit of education material on how to reduce the risk of venous needle dislodgement, a resounding 85.3% (n = 996) of the responders indicated that education material would be of benefit. The survey also offered respondents the opportunity to share additional comments about venous needle dislodgement. The respondents offered their views of criteria for patients they thought were at risk for venous needle dislodgement, factors that contributed to the patient’s risk, and interventions they

<table>
<thead>
<tr>
<th>Chronic Hemodialysis</th>
<th>70.7% (827)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Care</td>
<td>43.1% (504)</td>
</tr>
<tr>
<td>Nursing Education</td>
<td>8.4% (98)</td>
</tr>
<tr>
<td>Continuous Renal Replacement Therapy</td>
<td>8.3% (97)</td>
</tr>
<tr>
<td>Therapeutic Apheresis</td>
<td>4.4% (51)</td>
</tr>
<tr>
<td>Pediatric Nephrology</td>
<td>3.7% (43)</td>
</tr>
<tr>
<td>Other Areas with less than 3%</td>
<td>11.7% (140)</td>
</tr>
</tbody>
</table>

*Respondents were asked to list all of their practice areas. There were 1783 responses from 1170 respondents, indicating that many respondents work in multiple areas.

<table>
<thead>
<tr>
<th>Have you seen a venous needle dislodgement in the past five years?</th>
<th>All Respondents</th>
<th>Acute Care Practice Area</th>
<th>Chronic Hemodialysis Practice Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, 1 to 2 times</td>
<td>50.0% (583)</td>
<td>52.0% (262)</td>
<td>50.0% (412)</td>
</tr>
<tr>
<td>Yes, 3 to 4 times</td>
<td>18.4% (215)</td>
<td>16.3% (82)</td>
<td>21.4% (176)</td>
</tr>
<tr>
<td>Yes, 5 or greater times</td>
<td>8.2% (96)</td>
<td>8.7% (44)</td>
<td>8.8% (72)</td>
</tr>
<tr>
<td>No</td>
<td>23.3% (272)</td>
<td>23.0% (116)</td>
<td>19.8% (163)</td>
</tr>
<tr>
<td><strong>Total Respondents to the Question</strong></td>
<td>1166</td>
<td>504</td>
<td>823</td>
</tr>
</tbody>
</table>
Confused, restless, agitated patients; patients who are cognitively impaired; and patients with dementia.

- The VA analysis of root cause analysis and safety reports of bleeding during dialysis at VA dialysis centers found that “75% of the most significant bleeds occurred in patients who were restless, confused, agitated, or uncooperative” (Veterans Health Administration, 2008, p. 1).
- Lascano and Anderson (2011) reported that high-acuity patients with altered mental status are at a higher-than-average risk for venous needle dislodgement. This includes patients who may be confused because of Alzheimer’s disease. Other conditions, such as sedation or infection, can also lead to an altered mental state. Patients with a reduced level of consciousness and communication challenges may not be able to alert staff to a problem.

Patients who experience hypotension or muscle cramps during treatment.
- Needle security is at risk with excessive movement of the access limb.
- The patient may become diaphoretic, causing the tape to loosen.

Patients who refuse to keep the access areas and bloodlines uncovered.
- Lascano and Anderson (2011) addressed the importance of ensuring that the patient’s access and needles are visible at all times.
- The issue of patients who fall asleep with their access covered, resulting in unintended access limb movement and dislodgement, was mentioned multiple times as a risk for venous needle dislodgement in the ANNA Venous Needle Dislodgement Survey.
- Visibility was noted as an issue in the VA analysis (Veterans Health Administration, 2008).
- Intentional dislodgement by a patient was mentioned several times as a risk in the ANNA Venous Needle Dislodgement Survey.

Taping technique.
- ANNA Venous Needle Dislodgement Survey respondents repeatedly indicated that taping technique was critical to prevent venous needle dislodgement. Factors related to securing the needles included an access that is in a difficult location or has a deep angle of cannulation.
- A Cleveland Clinic improvement project included training staff on anchoring needle taping technique (Lascano & Anderson, 2011).
- Preparing the skin and the correct technique for the secure taping of the access needles are addressed in the ANNA Core Curriculum for Nephrology Nursing (Dinwiddie, 2008).
- The ANNA Venous Needle Dislodgement Survey results indi-
cated that patients with excessive hair in the access taping areas may experience loosening of the tape securing the needle(s) during the hemodialysis treatment. One experience with tape seeming to lose its adherence to the patient’s skin was described as loosening over time into the treatment.

- Patients who experience sweating (such as the sweating that can occur with hypotension or in a patient with diabetes who experiences hypoglycemia) have been identified as at risk for loosening of the tape that is securing the needles (Van Waeleghem et al., 2008).
- The ANNA Venous Needle Dislodgement Survey respondents indicated even a small amount of leakage around the needle site can cause tape to become loosened, increasing the risk of venous needle dislodgement.

Staff observation.

- Patient observation by the staff was noted as a risk factor by respondents to the ANNA Venous Needle Dislodgement Survey.

Staffing.

- Ensuring adequate staff-to-patient staffing ratios to allow routine monitoring of the patient’s access during the hemodialysis treatment was a recommendation of respondents in the ANNA Venous Needle Dislodgement Survey.
- The importance of monitoring of the patient’s access as a factor affecting the risk of venous needle dislodgement was noted by Van Waeleghem et al. (2008), who recommended that all patients should be monitored routinely and that higher risk patients require a higher level of observation.
- Regarding staffing, Hurst (2011a) noted that venous needle dislodgement can occur any time and anywhere, and can happen in “apparently routine treatments and with fully staffed units” (p. 149).

Patients on nocturnal and/or on home hemodialysis.

- Hurst (2011b) has discussed venous needle dislodgement prevention for the home hemodialysis population and suggested that patients should not rely solely on the dialysis machine’s internal alarm. Hurst (2011b) urged increased “awareness and vigilance” by anyone who receives dialysis and their caregivers.
- A number of ANNA Venous Needle Dislodgement Survey respondents described using a device that can detect blood loss to the environment to monitor the venous needle access site of patients on nocturnal and home hemodialysis.
- Laird (2011) recommended that patients on nocturnal hemodialysis use an approved moisture alarm device during their hemodialysis treatments in addition to doing proper taping. Laird (2011) also advocated for patients keeping needle insertion sites and bloodlines visible during the hemodialysis procedure, not taping bloodlines to an object, and not disabling pressure alarms on the dialysis machine.

Education and Awareness

Venous needle dislodgement was evidenced in the literature as a complication of hemodialysis with potential for harm. Multiple factors were identified that can contribute to the risk of venous needle dislodgement. This reality demands a combination of vigilance in monitoring and ongoing assessment of the patients, the dialysis machines, and other technologies that nephrology nurses use and manage. Lascano and Anderson (2011) indicated that expectations of this high level of nursing care can only be achieved when staff have been provided with education about the importance of the “safety first” message as it relates to venous needle dislodgement. Van Waeleghem et al. (2008) listed as their first practice recommendation that patient care staff and patients should be aware of venous needle dislodgement and its possible consequences, and also advocated for the education of patients/family as a “fundamental” role of the nephrology nurse.

Dialysis provider organizations should each develop evidence-based policies and procedures that are designed to foster a safe and effective treatment environment for the patient. To ensure safe care, it is essential that opportunities are provided for staff to learn about these expectations and be updated on venous needle dislodgement recommended practices and technologies on a regular basis.

Practice Recommendations

Based on the literature review and the results of the ANNA Venous Needle Dislodgement Survey, there are important practice recommendations that can be implemented to prevent venous needle dislodgement.

Prepare for Cannulation Of the Access Sites

Cleaning of the selected access cannulation sites and allowing the areas to dry before cannulation serves a dual purpose. Removal of bacteria from the skin helps prevent access infection. Some disinfectant solutions must be allowed to dry to be effective. Allowing adequate time for the site to dry before performing cannulation also helps to prepare the skin surface so the tape will be better able to adhere (Dinwiddie, 2008; Van Waeleghem et al., 2008).

Tape the Needles Securely

Taping the needles securely is key to preventing dislodgement (Lindley et al., 2010a; Mactier & Worth, 2007). The use of a chevron taping configuration is indicated as a method to secure the needle in the access vessel (Hurst, 2011b; Laird, 2011; Van Waeleghem et al., 2008). General guidelines for securing hemodialysis access needles can be found in the ANNA Core Curriculum for Nephrology Nursing (Amato et al., 2008). Mactier and Worth (2007)
reported on results from discussion of procedures for prevention of venous needle dislodgement at a Venous Needle Dislodgement Workshop that took place in the United Kingdom in 2006. This workshop was held after “…9 units had experienced 10 episodes of fistula needle dislodgement in 6 months” (Mactier & Worth, 2007, p. 9). While the authors indicated that a specific method for securing access needles was not agreed upon at the workshop, what was agreed upon was that the dialysis units should develop their own clear guidelines for securing access needles (Mactier & Worth, 2007).

Replace Tape if Repositioning The Needle

The tape should not just be loosened and then re-used after making a needle adjustment. This tape may have lost its stickiness in the process, leaving the tape and the needle only loosely in contact with the skin. Fresh tape should be applied to ensure the security of the needle (Van Waeleghem et al., 2008).

Secure Bloodlines

In their article on venous needle dislodgement and how to minimize the risk, Van Waeleghem et al. (2008) indicated that the bloodlines should be looped loosely “…to allow movement of the patient and to prevent bloodline pulling on the needles” (p 164). Keeping the bloodlines taped/attached to the patient was suggested as an intervention to help prevent an accidental dislodgement in the simple act of shifting position in a chair or rolling over in a bed. Bloodlines should be secured to the patient during treatment and not secured to an object, such as the dialysis chair, blankets, or the bed rail (RPA, 2012a, 2012b; Sandroni et al., 2008; Van Waeleghem et al., 2008).

Assure Access Visibility

It is essential for the access to be visible at all times (Gomez, 2011; RPA, 2007). The April 18, 2008, Medicare Final Rule for Conditions for Coverage statement includes “…the access sites and line connections should remain uncovered to allow staff to visually monitor these areas to ensure patient safety” (U.S. Department of Health and Human Services [DHHS], & Centers for Medicare & Medicaid Services [CMS], 2008, p. 20384). If there is venous needle dislodgement, patients and staff will be able to visualize the event and take action immediately (Lindley et al., 2010b). Access checks should be part of regular rounds to be sure the access needles are in the vessels and securely taped (Hurst, 2009; Pennsylvania Patient Safety Authority, 2012).

Use of Dialysis Machine Safety Devices

Hemodialysis machines have methods of displaying the measurement of venous pressure during the dialysis treatment with a default range for alarm parameters. However, reported incidents of venous needle dislodgement without a machine alarm sounding are found in the literature (ECRI Institute, 1998, Mactier & Worth, 2007, Sandroni, 2005). Several authors have indicated that the machines involved in venous needle dislodgements were tested after the incidents, only to find that the alarms were functioning and responded correctly within the default alarm limits (Sandroni, 2005; Sandroni, et al., 2008; Van Waeleghem et al., 2008). Van Waeleghem and colleagues (2008) concluded that even when the alarm limits are set, the drop in venous pressure may be too small to activate the alarm, for example, when “…the access pressure is too low or because the needle is incompletely dislodged or obstructed by material covering the needle sites” (p. 166). The venous pressure alarm safety feature cannot be used as the only defense for venous needle dislodgement. Vigilance and monitoring by staff are essential to provide safety from this potential complication (Veterans Health Administration, 2008).

Set the Venous Pressure Alarm Limit

Some machines allow the user to change the venous pressure alarm limit range. It was indicated in the literature that it could be helpful in monitoring for venous needle dislodgement to set the limits in an asymmetrical pattern (such as -30/470) with the lower limit of the venous pressure alarm as close as possible to the current venous pressure. This may increase the possibility of the machine sounding an alarm if a venous needle dislodgement occurs (Hurst, 2009; Mactier & Worth, 2007; Van Waeleghem et al., 2008).

Monitor Dialysis Catheters

Monitoring catheter accesses should be included in the nephrology nurses’ ongoing risk assessment of venous needle dislodgement. Catheters have luer lock connections that can be a source of blood loss if they are not connected tightly or if the luer lock is not threaded properly. Clip devices have been used to help hold the catheter ports and bloodlines together and to prevent disconnection (Fields, 2010).

Use of Moisture Monitors

Enuresis pads, designed for detecting moisture, have been described as having been used off-label in an attempt to protect high-risk patients from venous needle dislodgement; however, these pads have been found incapable of detecting very small volumes of moisture, making them ineffective as an early warning device for blood leaks (Hurst, 2009; Sandroni, 2005; Van Waeleghem et al., 2008).

Use of a Detection Device for Blood in the Environment

A number of researchers have recommended the use an FDA-approved device for blood in the environment with high-risk patients and for patients doing home hemodialysis (Ahlmen et al., 2008; Cowperthwaite, Rivers, Sundstrom, & Hegbrant, 2011; Fields, 2010; Hurst, 2009; Sandroni et al., 2008). An FDA-approved safety device, Redsense®, is specifically designed for use on a dialysis access to detect blood loss at the
access site and sound an alarm if it occurs. The device is connected by an optic fiber to a sensor patch with adhesive that allows it to be placed on the venous needle site (Ahlmen et al., 2008). The manufacturer’s literature indicates this device is able to detect as little as 1 mL of blood (Takeuchi et al., 2008).

These practice recommendations for the prevention of venous needle dislodgement are supported in the ANNA Core Curriculum for Nephrology Nursing, with recommendations to secure lock luer lock connections on all bloodlines and access lines; connect both arterial and venous bloodlines to access lines at the initiation of the hemodialysis treatment; and achieve complete stasis of access needle sites before the patient leaves and/or clamp and cap central venous catheters limbs (Dinwiddie, 2008). ANNA’s Nephrology Nursing Scope and Standards of Practice (Gomez, 2011) indicate that the nursing assessment should include the integrity of the extracorporeal circuit, connections, and delivery system alarms, and monitoring of the patient throughout the hemodialysis treatment. In addition, patient teaching recommendations with consideration of the patient and family’s health literacy should include the patient’s role in safe delivery of treatment, such as being aware of the effects of movement on the access and the need to keep the access site and extracorporeal connections uncovered. The nephrology nursing process of care for hemodialysis should include an individualized approach to educate patients and families regarding signs and symptoms that should be promptly reported to patient care staff (Gomez, 2011).

Resources

In response to the ANNA Venous Needle Dislodgement Survey and the literature review, the ANNA Venous Needle Dislodgement Special Project Workgroup reviewed existing venous needle dislodgement education materials with the goal of providing recommendations in easy-to-use tools to assist healthcare providers and patients to proactively minimize the risk of venous needle dislodgement. A venous needle dislodgement risk assessment tool for nephrology nurses from the European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) (2010) was adapted and revised based upon the ANNA Venous Needle Dislodgement Survey recommended risk criteria. A poster for patient care staff education from the EDTNA/ERCA work was adapted and revised based upon nephrology nurses’ indications of recommended practices to reduce the risks for venous needle dislodgement. In addition, a patient education tool was developed to assist in education of patients/family on how they can help to minimize their risk of venous needle dislodgement during hemodialysis.

The tools adapted and revised by the ANNA Venous Needle Dislodgement Special Project Workgroup are designed to present recommended practices as supported by current literature and as reported in nurses’ experiences with venous needle dislodgement obtained from the ANNA Venous Needle Dislodgement Survey. These tools have been provided in the format of a pocket card, a poster, and a one-page handout.

The pocket card is entitled “Assessment of the Risk for a Serious Venous Needle Dislodgement Incident” (see Figure 1). The literature supports the need for assessing the patient for potential risk of venous needle dislodgement as key to preventing its occurrence (Lindley, 2005; McCabe et al., 2009). The “Assessment of the Risk” tool is designed to assist the nephrology nurse in performing a four-level assessment of patient risk and to provide recommendations for interventions that correlate with each of four identified patient levels of risk.

The poster, Venous Needle Dislodgement (VND): How to Minimize the Risks, was designed to provide practice recommendations for patient care staff, patients, and other caregivers (see Figure 2). The recommendations start with the need to be aware of risk factors for venous needle dislodgement and the consequences of venous needle dislodgement. Recommendations progress from preparing the needle sites to securely taping the needles, securing and positioning the bloodlines, maintaining visibility, and monitoring the access during treatment. The tool concludes with venous pressure monitoring recommendations and technologic advancements of devices intended to detect blood loss to the environment from dislodgement of the venous needle.

Dialysis staff who have an understanding of the risks of venous needle dislodgement and strategies to reduce these risks can discuss the risks and strategies with patients, families, and other healthcare providers. The ANNA Venous Needle Dislodgement Special Project Workgroup developed an education tool, Help Us Keep You Safe!, that can be used as a handout as well as a poster in the dialysis unit to assist in initiating this important discussion (see Figure 3). This patient education resource was designed as a simple and visual message for the education of patients and families of their roles in helping the patient care staff keep patients safe during treatment.

All three of these resources were designed to serve as reminders of how patients can be at risk for venous needle dislodgement and to provide recommendations for how to minimize the risk of venous needle dislodgement.

Conclusion

A literature review and the results of the ANNA Venous Needle Dislodgement Survey validate venous needle dislodgement as a potential complication of hemodialysis therapy. Patient care staff and patient awareness of the risk have been identified in the literature review, and the ANNA Venous Needle Dislodgement Survey is an important factor in the prevention of venous needle dislodgement.
### Overall Risk for a Serious Venous Needle Dislodgement Incident

Add up the scores for questions 1 to 4 to obtain the overall risk.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>Means that the patient is at Low Risk for a serious VND incident.</td>
</tr>
<tr>
<td>3-4</td>
<td>Means that the patient is at Medium Risk for a serious VND incident.</td>
</tr>
<tr>
<td>5-8</td>
<td>Means that the patient is at High Risk for a serious VND incident.</td>
</tr>
</tbody>
</table>

#### Recommendations

Apply the ANNA recommendations to minimize the risks:

- Ensure that the patient is properly educated on the importance of VND prevention.
- Make it easy for the patient to access the needle and the VND detector.
- If appropriate, increase the frequency at which staff check the security of the needles.
- If available, consider use of a protective device approved for detecting VND.

#### Pocket Card: Assessment of the Risk for a Serious Venous Needle Dislodgement Incident

1. **What is the likelihood that the staff (or care giver) will fail to observe an actual or potential VND for this patient?**

   The likelihood of the staff (or care giver) failing to detect VND, or conditions that could lead to VND if not corrected, will be very low/low if staff can observe the patient and access easily. The likelihood will increase to medium or high if there are few staff to make regular checks of the needles and if the staff are unable to see the access widely due to the patient’s location, covers, poor lighting etc. Using a device that alarms when a VND occurs reduces this score to 0.

<table>
<thead>
<tr>
<th>Points</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

2. **What is the likelihood that the patient will fail to raise the alarm if they experience VND?**

   The likelihood of the patient failing to raise the alarm is very low/low if the patient understands the implications of VND and is sufficiently alert to take action if a VND or a problem that could lead to VND occurs. The likelihood will increase to medium or high if the patient is not sufficiently alert due to sedation, medication, sleep, fatigue, or other factors. Using a device that alarms when a VND occurs reduces this score to 0.

<table>
<thead>
<tr>
<th>Points</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
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</table>

3. **What is the likelihood of the patient behaving in a way that could lead to VND?**

   (Note: Do not consider the security of taping here, that is covered in question 4.)

   Ideally, the likelihood that a patient’s actions during dialysis will lead to VND will be very low. The likelihood will increase to low or medium/high if the patient suffers side effects (e.g. hypotension, hypoglycemia, cramps, itching) that could lead to unpredictable movements, if they are restless, not fully awake, or are intolerant of using an ultrasound, or are known to tamper with the access, needles and/or lines. Patients who have had more than one unexplained needle dislodgement should score 2.

<table>
<thead>
<tr>
<th>Points</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

4. **What is the likelihood of the tapping failing to ensure that the needle is secure throughout dialysis?**

   (Note: Do not consider tampering by the patient here, that is covered in question 3.)

   The likelihood of the tapping failing to secure the needle will be very low if a standard tapping protocol designed to prevent VND is used. The likelihood will increase to low or medium/high if the tapping technique does not include measures to resist tugging on the needle tubing or has to be modified in a way that makes it less secure (due to allergy, steep needle angle etc), or if there are problems with excessive body hair, sweating or oozing from the needle site.

<table>
<thead>
<tr>
<th>Points</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
## Figure 2
Poster from the ANNA Venous Needle Dislodgement Special Project Workgroup

<table>
<thead>
<tr>
<th><strong>AWARENESS</strong></th>
<th><strong>How to Minimize the Risks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Education materials for staff, patients, and care providers.</td>
<td></td>
</tr>
<tr>
<td>An area around the vascular access large enough for taping should be cleaned and allowed to dry before cannulation.</td>
<td></td>
</tr>
<tr>
<td>Hemodialysis units should follow their organization’s policy and procedure for taping needles and blood lines. Resources addressing secure taping of access needles include: ANNA Core Curriculum, 5th Edition, pg 737-738 - FistulaFirst: <a href="http://www.fistulafirst.org">www.fistulafirst.org</a></td>
<td></td>
</tr>
<tr>
<td>Blood lines should be looped loosely to allow movement of the patient but prevent blood lines from pulling on the needles.</td>
<td></td>
</tr>
<tr>
<td>If it is necessary to reposition a needle, all taping should be replaced and needles secured with fresh/new/clean tape.</td>
<td></td>
</tr>
<tr>
<td>Vascular access and needles should be visible at all times during hemodialysis.</td>
<td></td>
</tr>
<tr>
<td>Checking the vascular access should be part of the monitoring routine during hemodialysis treatment.</td>
<td></td>
</tr>
<tr>
<td>All patients should be assessed for level of risk of VND following “Assessment of the Risk For a Serious Venous Needle Dislodgement Incident, Recommendations for Nephrology Nurses.” If appropriate and available, an alarm device intended for monitoring VND may be used.</td>
<td></td>
</tr>
<tr>
<td>When the venous pressure alarm is activated, the vascular access, needle sites, and blood line positions should always be inspected prior to resetting the alarm and/or alarm limits.</td>
<td></td>
</tr>
<tr>
<td>The lower limit of the venous pressure alarm should be set as close as possible to the current venous pressure, as allowed by the dialysis equipment.</td>
<td></td>
</tr>
<tr>
<td>Staff, patients, and care partners should be aware that the venous pressure monitoring system of the dialysis machine can often fail to detect VND. If the change in pressure does not cause variation of the pressure reading beyond the pressure indicator’s set limits, an alarm may not occur.</td>
<td></td>
</tr>
<tr>
<td>Additional protection can be provided by devices intended to detect blood loss from the needle site to the environment.</td>
<td></td>
</tr>
</tbody>
</table>

For a detailed exploration of these recommendations please go to www.annanurse.org/Resources/SpecialProjects.
Venous Needle Dislodgement in Patients on Hemodialysis

As a result, the ANNA Venous Needle Dislodgement Special Project Workgroup developed a tool containing recommendations for the assessment of the risk of venous needle dislodgement and an education resource with proactive recommendations that can be utilized by all patient care staff collaboratively to minimize the risk of venous needle dislodgement. The patient education resource can be of value for the education and engagement of patients and family members to minimize the risks of venous needle dislodgement in hemodialysis.

Nephrology nurses must lead the way in their essential roles of working collaboratively with all patient care staff, patients, and families to reduce the significant and potentially fatal complication that can occur from loss of blood due to venous needle dislodgement.

References


Additional Reading