

Patient safety

Are staff using compression hose correctly?

Are your perioperative staff using graduated compression stockings correctly? A study suggests many nurses aren't. In the study, conducted at one large hospital, 1 in 4 patients had compression hose that were the wrong size. Nearly 1 in 3 had stockings applied incorrectly, and 1 in 5 patients didn't know what the stockings were for. The study was reported in the September 2008 *AJN*.

Data were collected on 142 postoperative patients. For more than two-thirds, data were collected on the day of surgery or the following day. The researchers planned to enroll 200 to 300 patients but stopped the study because of the problems they discovered.

The hospital has since made improvements, including providing more nursing education, developing a way to supply tape measures and sizing charts for compression stockings, including stocking use in skin assessments, and educating patients.

Elizabeth H. Winslow, RN, PhD, FAAN, who led the study, thinks other hospitals are likely to have the same problems. She also thinks the findings are important for perioperative nurses and managers. Though the study didn't collect data on who applied the stockings, many likely were placed by perioperative nurses before or immediately after surgery. The study was conducted with Debra L. Brosz, RN, MSN, ONC, NEA-BC, nurse manager of the orthopedic unit.

(The hose are commonly called TED stockings, a brand name of Covidien's Kendall unit.)

As a resource for practice, managers can refer to the Guidance for Prevention of Venous Stasis in AORN's 2008 *Perioperative Standards and Recommended Practices*.

Why correct use is important

Studies have shown that graduated compression stockings in combination with other measures reduce the risk of deep-vein thrombosis (DVT), a serious complication of surgery.

Research has shown that when fitted and used properly, the stockings increase velocity of blood flow, reduce the risk of venous dilation and intimal tears, improve venous valve function, and may reduce coagulability, which all lower DVT risk.

Used incorrectly, compression stockings do not reduce DVT—in fact, they may increase it. Improper use can also contribute to skin breakdown.

"Essentially, the stockings can become a tourniquet, reducing blood flow and increasing venous dilation, which increase the risk of DVT," says Winslow, who is research consultant at Presbyterian Hospital in Dallas.

"It's important that perioperative nurses make sure the stockings are being used and sized correctly," Winslow says. "After as few as 2 hours of surgery, a patient can develop skin breakdown from improperly used stockings."

Thigh high or knee high?

In one discovery from the study, thigh-high stockings were associated with more



Incorrectly used compression stockings can become a tourniquet, reducing blood flow.

problems than knee-high stockings. Thigh-high hose were more likely to be the wrong size, be uncomfortable for patients, and be linked to skin problems. These problems were more common in overweight patients. Knee-high hose are also easier to apply.

Other researchers have shown both lengths are equally effective for preventing DVT. A large study being completed in Europe may soon provide additional information. "Based on the research we have, there is no difference in efficacy in preventing DVT between the knee-length and thigh-length stockings," Winslow says.

For these reasons, the authors recommend that knee-length compression stockings should be the standard length for DVT prevention.

Brosz says she was surprised to find nurses had misconceptions about the cost of the stockings. When she asked nurses how much they thought the stockings cost, most said about \$50. In fact, the hospital's cost is about \$5 for thigh-high hose and about \$2.50 for knee-high hose. Cost was one reason some nurses were reluctant to change hose that were the wrong size.

Does your OR need to improve?

What steps can perioperative managers take to ensure the stockings are used correctly?

Winslow suggests conducting a small performance improvement study along the lines of her research. Select a small sample of patients and check to see if the stockings are sized and applied correctly.

"First, you need to know what to look for—stockings applied smoothly with no wrinkles and the heel in the pocket," she says. "Many nurses have not been educated in that."

To check the size, remove the stockings from the patient, measure the patient's legs, and use the manufacturer's sizing chart to determine the recommended size. Compare the size the patient is wearing with the recommended size.

She's found many nurses don't know how to measure the patient's legs correctly or use the sizing chart.

If problems are found, conduct education, and resample to see if there has been improvement.

Improving use of compression stockings

These are steps taken at Presbyterian Hospital of Dallas.

- **Improved staff education.** "One of the first things we did was to make sizing and use of TED stockings a routine part of education and orientation for RNs and unlicensed assistive personnel," says Winslow. Use of compression stockings was also added to competency skills days on patient units.
- **Included compression stockings in skin assessments.** Skin-problem prevalence studies are conducted quarterly.

"The skin resource nurses include checking the TED size in their evaluations when they look for pressure ulcer prevalence," says Brosz. The hose are removed as part of the head-to-toe assessments, and patients' legs are measured to check for proper TED size. Education is targeted for units that need improvement.

- **Set up a supply chain** for tape measures and size charts. To make sure the stockings are the proper size, nurses need ready access to tape measures and sizing charts. "You would think this would be easy, but it took a lot of effort," Winslow says.

Nurses worked with the central service (CS) department to develop a way to track and restock the inventory of tape measures and sizing charts. The company now sends tape measures and sizing charts to CS, which resupplies the nursing units. They are placed in a bin in the Pyxis machines where TED hose are kept.

"We were surprised the company didn't have a system for stocking the measuring tapes and sizing charts," Winslow adds. "We really need to get the manufacturer to help us out."



A skin problem on the foot from an improperly applied stocking.

- **Developed and distributed a compression-stocking protocol.** Winslow wrote an evidence-based protocol that is posted on the hospital's internal website. Evidence-based flyers were distributed to the nursing units.
- **Included compression stocking problems on the incident report form.** A specific item for TED hose was added to the incident report forms so nurses could simply circle it. This makes it possible to track and trend data, though no definite trends have emerged so far.
- **Encouraged physicians to change their orders to knee-high stockings.** This effort seems to be successful. The past 2 skin-problem prevalence surveys have found no thigh-high stockings in use, which Winslow and Brosz count as a big success.
- **Developed plans to educate patients.**

A patient education sheet was developed that is appropriate for all reading levels. The sheet informs patients why the stockings are important, how to care for them, and how long to keep using them after discharge.

"Many health care providers seem complacent about compression stockings," Winslow observes.

"They seem unaware of the benefits associated with TEDs that are correctly used and sized—and the many risks if they are incorrectly used and sized. This is a nursing problem that nurses need to correct so patients can benefit." ♦

—Pat Patterson

References

AORN Guideline for Prevention of Venous Stasis. *2008 Perioperative Standards and Recommended Practices*. Denver, CO: AORN, 2008. www.aorn.org.

Winslow E H, Brosz D L. Graduated compression stockings in hospitalized postoperative patients. *AJN*. 2008; 108(9):40-50.

Compression hose study

The comparative, descriptive study involved 142 hospitalized postoperative patients; 37 had thigh-length and 105 had knee-length stockings.

The researchers assessed use of the stockings and compared 4 separate leg measurements against the manufacturer's sizing chart to determine whether the stockings were the correct size. They also asked patients to rate the comfort of the stockings and to describe their purpose.

The findings:

- In 29% of patients, the stockings were used incorrectly; for example, they were wrinkled, or the gusset was in the wrong place.
- In 26%, the stockings were the wrong size. Problems were more common with thigh-length stockings and in overweight patients.
- More patients with thigh-length stockings found them uncomfortable compared with patients with knee-length stockings.
- 20% of patients didn't understand the stockings' purpose.

Source: Winslow E H, Brosz D L. *AJN*.2008;108(9):40-50.