BACKGROUND
In 2011, a hospital began collecting bloodstream infection (BSI) data for the National Healthcare Safety Network (NHSN). The data showed that the Bone Marrow Transplant Unit had much higher BSI rates than other units in the hospital. The high rates appeared to be due in part to the extreme vulnerability of bone marrow and stem cell transplant patients, because non-transplant oncology patients in the unit were not affected.

Transplant patients have two major vulnerabilities:
- They receive quad-lumen central lines upon admission. All four lumens are continually used, providing multiple openings for bacterial ingress.
- Before transplantation, patients' immune systems are completely ablated.

Accordingly, the unit sought to implement preventive practices and technologies.

PROJECT
In late-2011, the unit implemented a chlorhexidine gluconate (CHG) bath for patients.

In February 2012, the unit commenced a three-month trial of an intravenous (IV) needleless connector with design elements aimed at preventing BSIs. For instance, the “zero displacement” connector does not cause blood reflux in the connector’s fluid pathway when tubing/devices are connected or disconnected. It also has a straight fluid pathway that is easy to flush clean of blood. The literature shows that positive and negative displacement connectors, by comparison, are associated with higher BSI rates. These higher infection rates for positive and negative displacement connector may be due to blood reflux and hard-to-flush/clean fluid pathways, among other design problems.

Implementation of the zero displacement connector was supported with staff education. Nurses took ownership of connector placement, including relevant patient education.

In August 2012, the unit implemented a new version of the connector with a chlorhexidine and silver-impregnated septum (InVision-Plus CS connector). This chlorhexidine-silver combination has been shown to be more effective at killing pathogens than silver alone. The device also has a silver-impregnated pathway and hub.

RESULTS
The novel chlorhexidine-and-silver impregnated connector was associated with a 36% reduction in BSI rate among a highly vulnerable patient population.

BSI rate for eight months following implementation of the chlorhexidine-and-silver impregnated connector (Aug. 2012-March 2013) = 3.13/1,000 catheter days

BSI rate for the eight months preceding implementation (Dec. 2011-July 2012) = 4.92/1,000 catheter days

Note: This data is from a quality improvement initiative, not prospective research.

LESSONS LEARNED
- IV connectors are often overlooked when hospitals try to address high BSI rates, even though the literature shows certain widely used types (positive and negative displacement) to be more infection-prone.
- A connector that combines chlorhexidine and silver with other preventive advantages may be associated with reduced BSIs.
- The vulnerabilities of potential transplant patients require efforts to prevent BSIs beyond standard bundle protocols.

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