

Use of Tego™ Connectors to Prevent Hemodialysis Catheter Infections in Children

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BACKGROUND

- 78.5% of pediatric patients on HD use central venous catheters (CVC) (NAPRTCS, 2006)
- Common complications, bacteremia, thrombosis, and catheter malfunction, associated with CVCs increase morbidity, mortality, and shorten catheter survival.
- In 2005 our center experienced a higher than desired infection rate in patients with CVCs.
- We undertook a quality improvement (QI) project using Tego™ connectors hypothesizing that use of Tego™ connectors in a chronic outpatient hemodialysis population would reduce the incidence of catheter related bacteremia.

MATERIALS AND METHODS

- October 1, 2005 began the use of Tego™ connectors
- Connectors were replaced on Monday or Tuesday of each week (patients receiving 3+ treatments/wk were replaced on Monday and Friday).
- Changes were done with sterile set up using aseptic technique.
- Masks were worn by patients and staff for connector changes since the catheter lumen was exposed to air.
- Connectors were cleaned between treatments with alcohol and allowed to dry.
- Lines were locked with heparin according to protocol and labeled "High Dose Heparin Do Not Flush" at completion of treatment.
- Data were collected on number of infections, line revisions and total patient-months at risk by quarter.
- Historical control data on infections occurring with male/female port caps were available from January 2001 through September 2005.
- Historical control data on line revisions were available from January 2002 through September 2005.
- A negative binomial model was used to estimate the incidence rate ratio and a corresponding 95% confidence interval for comparison of event rates before and after the switch to Tego™ connectors.
- The model was formulated with number of infections or number of line revisions as the dependent variable, an indicator of pre/post Tego™ switch as the independent variable and an exposure variable to adjust for patient-months at risk in each calendar quarter.
- IRB approval was obtained for this study from Children's Hospital and Regional Medical Center Internal Review Board (IRB).



RESULTS

- The immediate pre-Tego™ sample included 21 patients with 93 months of dialysis therapy.
- The post-Tego™ sample included 29 patients with 207 months of dialysis therapy.
- Patients ranged in age from 3 to 20 years with the average age 12-14 years.
- Number of infections per 1,000 patient-days were as follows:
 - 7.8 infections per 1000 patient-days during the pre-TEGO™ period vs.
 - 3.62 infections per 1000 patient-days post TEGO™
- The BSI Incidence Rate Ratio was 0.47 (95% CI: 0.23 - 0.96), indicating the BSI rate with TEGO™ was less than half the BSI rate in the preceding 5 quarters. This is a statistically significant reduction (p=0.05).

Pre Tego Experience					
Quarter	Bloodstream Infections		Line Revisions		
	infections/ pt-months	Rate per 1000 patient-days	Rate per 1000 patient-days		
2001 Q1	5 / 25.9				
2001 Q2	6 / 28.4				
2001 Q3	3 / 28.1				
2001 Q4	1 / 15.4				
2002 Q1	6 / 26.2				
2002 Q2	1 / 32.1				
2002 Q3	1 / 29.6				
2002 Q4	3 / 35.1				
2003 Q1	2 / 24.7				
2003 Q2	6 / 26.9	5.85	5.36	4.64	4.76
2003 Q3	8 / 27.9				
2003 Q4	8 / 30.2				
2004 Q1	5 / 25.7				
2004 Q2	6 / 17.7				
2004 Q3	4 / 17.9		7.8		4.27
2004 Q4	0 / 16.3				
2005 Q1	5 / 19.2				
2005 Q2	6 / 22.4				
2005 Q3	7 / 16.8				

Quarter	With Tego Bloodstream Infections		Line Revisions		
	infections/ pt-months	Rate per 1000 patient-days	Rate per 1000 patient-days		
2006 Q1	0 / 16.4	3.62	3.62	3.29	3.29
2006 Q2	2 / 14.9				
2006 Q3	3 / 20.0				
2006 Q4	2 / 26.0				
2007 Q1	2 / 29.2				
2007 Q2	5 / 22.1				
2007 Q3	7 / 41.7				
2007 Q4	0 / 36.7				

CONCLUSIONS

- Although technical improvements in vascular access surgery may allow AV fistulas or grafts in more patients, central venous catheters will remain a necessary mode of vascular access in many children, especially the very young.
- Further research needs to be done to devise methods to prevent infections and malfunction of these catheters (Neu, Ho, McDonald, & Warady, 2002).
- Use of Tego™ connectors has provided one method for our unit. We anticipate continued success with the use of these connectors.

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