

# **Reduction in Catheter Related Bloodstream Infections with Weekly Dosing of 100% Ethanol Lock Therapy in Chronic Home Parenteral Nutrition Patients**

Marianne Opilla, John Siepler, Reid A. Nishikawa,  
Tom Diamantidis, Rod Okamoto  
Nutrishare, Inc  
Elk Grove, California

Reduction of CRBSI is a  
priority in the HPN consumer's  
plan of care

# Lock Therapy

- Treatment or prophylactic measure
- Small volume of concentrated lock solution is instilled into the catheter
- Solution remains in the catheter lumen for a period of time allowing for biofilm exposure
- May eradicate or decrease levels of intraluminal biofilm

# Ethanol Lock Therapy (ELT)

- Bactericidal and fungicidal
- No known pathogenic resistance
- Inexpensive and available as dehydrated ethanol 98% ampules
- Compatible with silicone catheters
- Ethanol exposure may crack polyurethane catheter material

# Case Reports

## ■ Maki DG, et al., *J Infection*, 2003

- 20 year old female
- Intestinal pseudo-obstruction with short bowel
- 14 CRBSI's and 4 Hickman catheters in 6 years
- 35 infection free months using daily 25% ELT with 1 hour dwell time

# Case Reports

- **Ball BA, et al., *Nutrition*, 2003**
  - Female on HPN X 14 years
  - Chronic recurrent CRBSI
  - ELT 100% daily X 14 days with systemic antibiotic therapy
  - Then ELT 100% weekly with 12 hour dwell
  - Infection free X 2 months

# Case Reports

- **Metcalf SC, et al., *J Infection*, 2004**
  - 31 year old male
  - Crohn's Disease with short bowel syndrome
  - 22 CRBSI's in 7 years
  - > 3 years infection free using daily 3 ml 70% ELT with 12 hour dwell time

# ELT as Treatment for CRBSI

## ■ **Dannenberg, et al. *Journal of Pediatric Hematology/Oncology*, 2003.**

- 79 children ages 2 – 18 with oncology diagnosis
- 2 years of data collection
- Positive blood cultures and clinical evidence of CRBSI
- 2.3 ml 74% ELT with antibiotic treatment
- 67% of ELT group had no recurrent infection in 4 weeks compared with 47% in non-ELT group



# ELT as Treatment for CRBSI

- **Onland W., et al., *Archives of Pediatric Adolescent Medicine*, 2006**
  - 1 year retrospective review of medical records of children with long term CVAD, all diagnosis
  - 40 children using the ELT protocol were treated for 51 CRBSI's
  - 0.8 ml – 1.4 ml 70% ELT X 12-24 hour dwell X 5 days.
  - 88% had no recurrent CRBSI after 30 days

# Prophylactic ELT

## ■ Opilla, et al. *JPEN*, 2007

- Retrospective medical record review of ELT users
- 9 frequently infected adult HPN consumers
- Daily 25%-70% ELT with dwell time of 2-4 hours
- Infection rates: 8.3/1000 days pre ELT vs. 2.7/1000 days post ELT
- No adverse effects noted

# Prophylactic ELT

## ■ Mouw E., et al., *Journal of Pediatric Surgery*, 2008

- Retrospective medical record review of ELT users
- 10 children with short bowel syndrome on HPN
- Daily 70% ELT with dwell of 4 – 14 hours
- 5 had infection rate 11.15/1000 days pre ELT vs. 2.06/1000 days post ELT
- 5 who started ELT with initiation of TPN: infection rate 1.85/1000 days
- No adverse effects noted

The aim of our study was to determine incidence of CRBSI before and after initiation of weekly dosing of 98% dehydrated ethanol as a lock in a group of frequently infected HPN consumers.

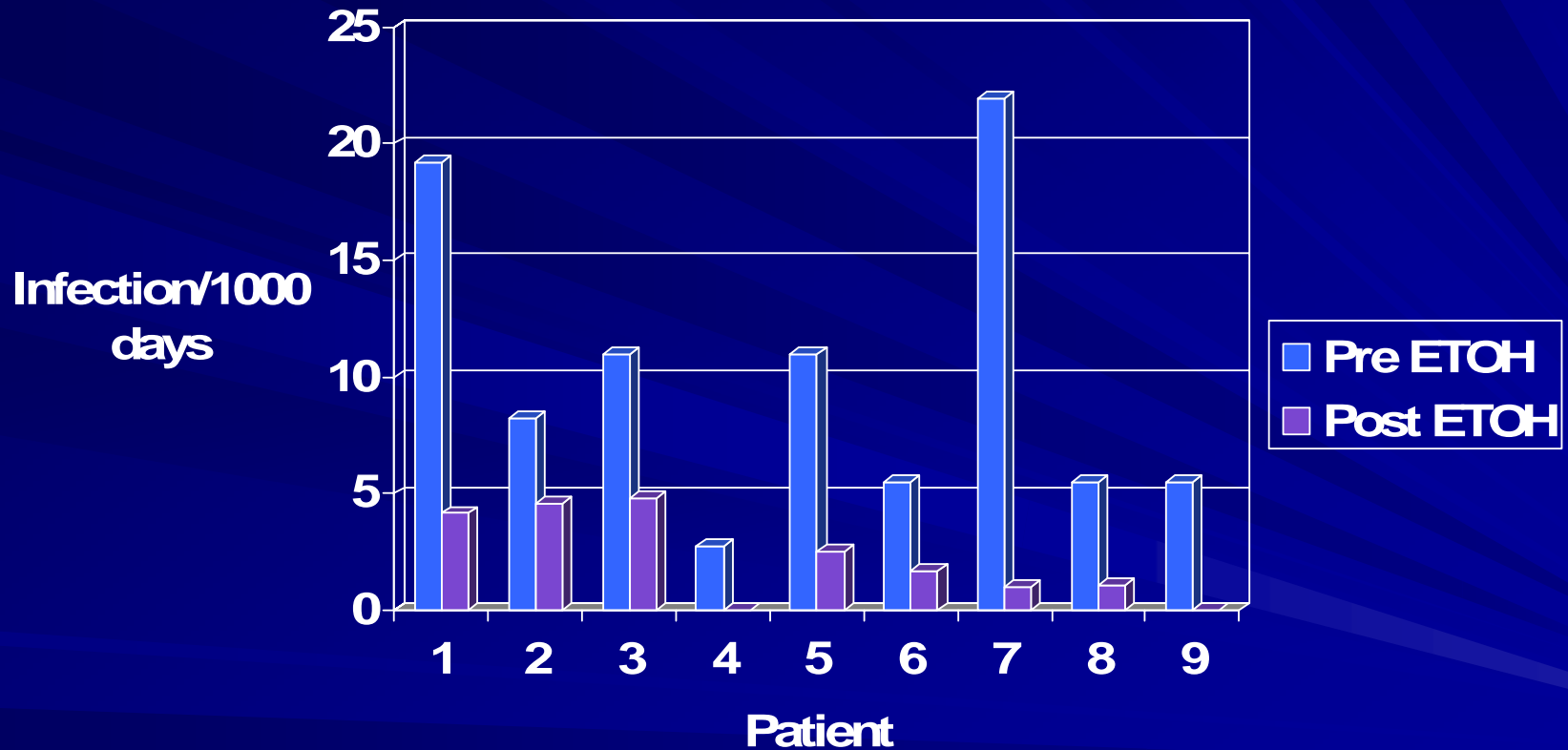
# Methods

- Medical records from one home care provider were reviewed for the past 5 years to determine ELT users.
- Only patients with 3 months or more of CRBSI data were included.
- Qualifying patients had 2 or more CRBSI's in a 3 month period.
- 2-3 ml of 98% dehydrated ethanol instilled weekly into catheter lumen
  - 2-4 hour dwell
  - Saline flush
- Comparison of incidence of CRBSI 1 year before and after initiation of ELT until 8/30/08.
- Statistics were done using paired T with  $p < 0.05$  considered significant.

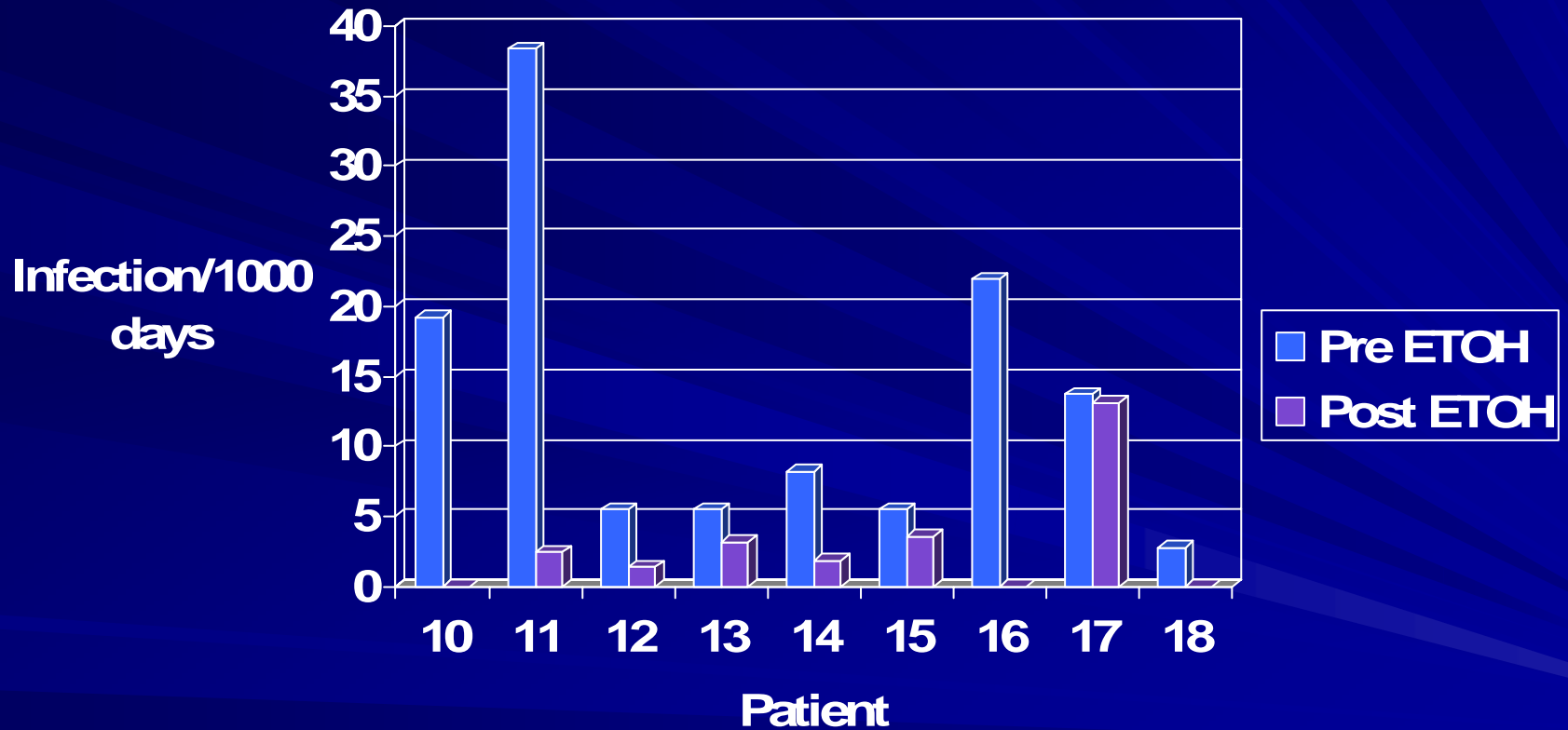
# Results

- 27 patients qualified
- Age  $44.7 \pm 19.2$  years (Range 10 – 77 yrs)
- 70% female
- Mean duration of ELT  $1.9 \pm 1.2$  years
- No adverse effects reported

# Individual Results



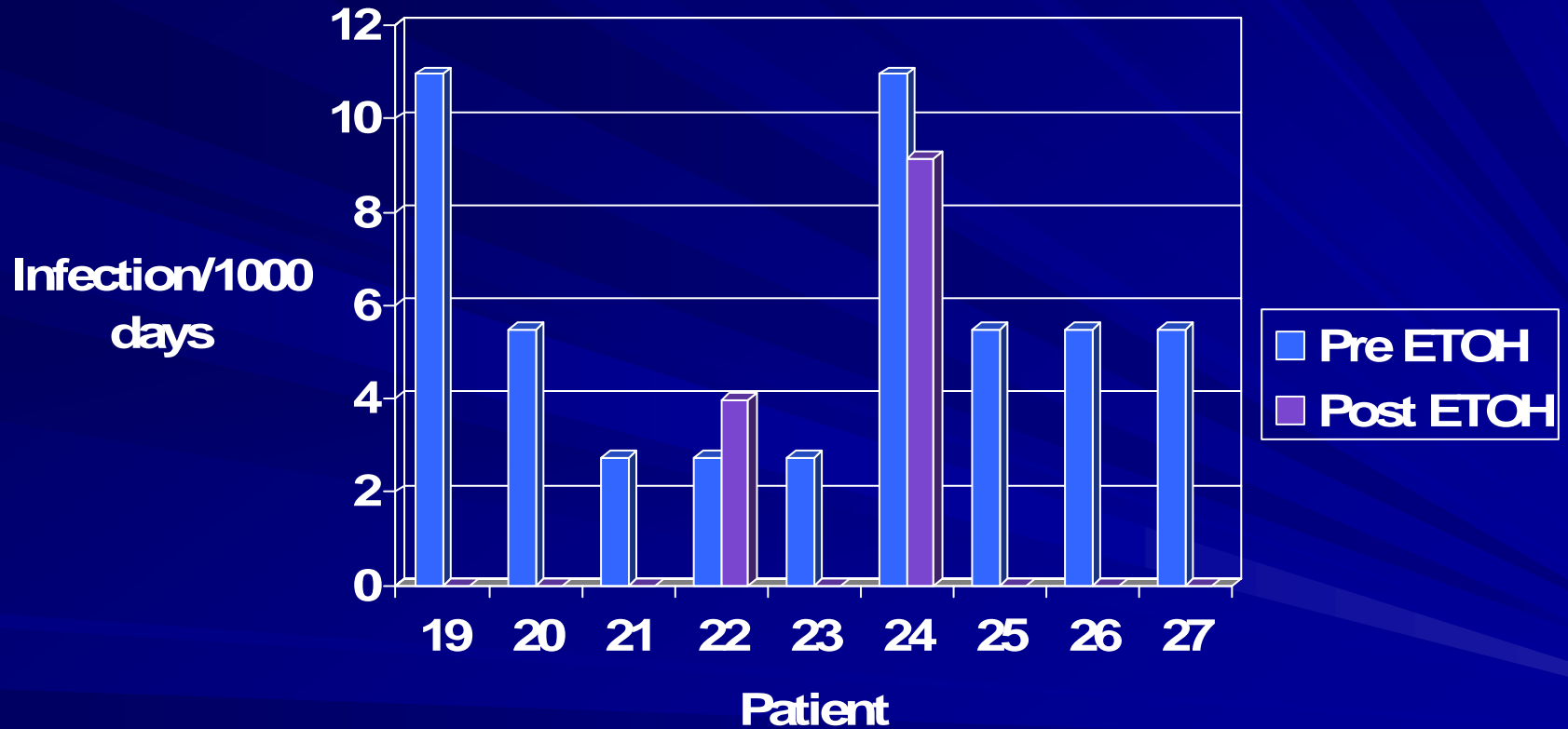
# Individual Results





# Results

(paired T test)



# Infection Rate Results

- Pre ELT infection rate:

9.74 ± 8.2/1000 catheter days

- Post ELT infection rate:

2.15 ± 3.1/1000 catheter days

- $P < 0.0001$

# Conclusion

- Additional measures to decrease the incidence of infection and individual therapy compliance are not reported but may have contributed to the results.
- Weekly dosing of 98% dehydrated ethanol demonstrates efficacy as a prophylactic measure for reducing the incidence of CRBSI in a frequently infected HPN population
- Further studies are warranted