

## Impact of Midline Devices on Outcomes among Elderly Patients

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Rec Date: May 30, 2016, Acc Date: Jun 21, 2016, Pub Date: Jun 24, 2016

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### Background

In recent years, we have witnessed significant developments in the intravenous drug administration sector. This is especially true in the case of patients whose therapy is expected to last longer than three days, and the infusion still meets the criteria for a peripheral line. In this clinical situation we have the availability of midline catheters, devices able to remain in place for the duration of therapy for mid-long term IV therapy, both for in and out of hospital therapies and both for continuous and discontinuous therapies. The Centers for Disease Control and Prevention (CDC) of Atlanta, in the latest guidelines for the prevention of intravascular catheter-related infections strongly recommend (category IB) midlines devices use when intravenous drug administration is estimated to be greater than six days, in order to reduce the intravascular catheter-related bloodstream infections (CRBSI). But still nowadays we do not know how much the proper use of these devices can reduce the mortality rate in elderly hospitalized patients. From 09/29/2013 it was established in our department a "Vaeno-Team", a group of doctor and nurses specialized in selecting and implanting catheters for each patient on the basis of the intended purpose and duration of use, known infectious and non-infectious complications (e.g., phlebitis and infiltration), and on the basis of experience of individual catheter operators.

### Subjects and Methods

We performed a retrospective analysis involving patients 75 years of age or older, hospitalized in our Department during the next 2 years following 09/29/2013 and we compared this population with the population made by patients admitted to our department in the 6 years before that date. The inclusion criteria were: age  $\geq 75$  years, regular hospitalization by admission as an inpatient in the geriatric ward.

### Outcomes

The primary aim of our study was to compare mortality ratios in patients who underwent "Vaeno-Team" evaluation for selecting and implanting midlines catheters in the two years following 09/29/2013 with that of inpatients on the geriatric ward in the six years before this date. Secondary outcome measure was average hospital stay in the two groups.

### Statistical Analysis

All the statistical analysis were performed with statistical software: rates and proportions were calculated for categorical data and medians and ranges for continuous data. For categorical variables, differences were analyzed by means of the Odds Ratio test. There were no missing data. Reported P values are two-sided. P values of less than 0.05 were considered to indicate statistical significance. The mortality rate of the

Geriatric Ward in the periods analyzed was obtained solely for the purposes of the study and without involving sensitive data of those involved. The data sheets showing the Midline devices implanted, compiled during the Vaeno-Team evaluations, do not allow the identification of those involved.

### Results

Baseline demographic and clinical characteristics of the patients are shown in Table 1.

	First 6 years before Vaeno-Team activity	First 2 years of Vaeno-Team activity	P value (95% C.I.)
<b>Patient number</b>	11819	3971	
<b>Age</b>			
<b>Mean</b>	85.03	86.01	
<b>Median</b>	85	85	
<b>Range</b>	75-105	75-103	
<b>Sex-n (%)</b>			
<b>Males</b>	4453 (37.7)	1590 (40.0)	
<b>Females</b>	7366 (62.3)	2381 (60.0)	
<b>Average Hospital Stay</b>			
<b>Mean</b>	9.25	9.12	
<b>Deaths</b>	1510 (12.78)	456 (11.48)	0.03 (0.79-0.99)
<b>Males</b>	665 (44.0)	199 (43.6)	
<b>Females</b>	845 (56.0)	257 (56.4)	

**Table 1:** Baseline demographic and clinical characteristics of the patients.

In the six years preceding the beginning of midlines use it was recorded a 12.78% mortality rate (1510/11819 patients, 44.0% Male), while in the two years of usage on the midlines devices there has been a decrease in mortality rate of 1.29% (456/3971 patients overall mortality 11.48%, 43.6% Male) with  $P < 0.05$  ( $P = 0.0328$  odds ratio: 0.886 [95% CI 0.792-0.990]). Difference in the average hospital stay between the two groups was non-significant

### **Study Limitations**

The present data are based on the activity through years of our Geriatric Ward, with admission date, age, sex and average hospital stay as variables considered, and this study is intended as a first look on mortality rate in the very first years since our “Vaeno-Team” was formed.

### **Conclusions**

Our preliminary data show that availability of midlines with a “Vaeno-Team” evaluation for midline catheters implants could improve the survival rate among Patients 75 years of age or older that are regularly hospitalized by admission as inpatients in the Geriatric Ward.