

Incidence of Complications of Peripheral Venous Access in the Type 2 Diabetic Population.

Analysis of risk factors and comparative study in Midlines

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Introduction

A recent systematic review has estimated that the direct annual cost of Diabetes treatment and care is over \$ 827 billion and has been independently associated with nosocomial complications.

Furthermore, it is estimated that up to 90% of patients in hospitals require a peripheral venous catheter which have their own risks.

New medium-sized peripheral devices (Midline®) is opening new clinical possibilities, improving safety and comfort during treatment time and reduction of complications.

Our observational case-control study has been proposed in order to analyse the impact of T2DM disease and associated complications on the patient requiring peripheral venous access.

Our primary outcome is to assess how T2DM influences on peripheral venous catheters complications.

KeyWords: Catheter-Related complications, Diabetes Mellitus Type 2, Midline Catheter

Materials and methods

This Prospective case-control study has been carried out with hospitalized patients of Vall d'Hebron Campus University Hospital in Barcelona, Spain. Research data have been collected by the vascular access nursing team. The aim of our investigation was to analyse complications related to peripheral venous access and how long the catheters last between the control group and the sample population with T2DM. General clinical and anthropometric data, reason for admission, co-morbidities, and all variables related to diabetes were also evaluated.

Inclusion Criteria:

- Patient’s age >40 years <90 years
- Peripheral venous access requirement >7 days
- Administration of intravenous treatment

Exclusion Criteria:

- Peripheral venous access for urgent or life-threatening pathology
- Acute psychiatric pathology
- Impossibility of peripheral venous access through the upper limb (amputations, extensive burns, etc.)
- History of venous thrombosis due to catheter less than 1 year

Results

233 Midlines were placed in 6 months (March to August 2019), 151 of them in non diabetic population and 82 in diabetic patients.

There was a similar distribution for age, gender, degree of assistance required (Barther Scale) and time of treatment.

Body Mass Index (kg/m2) in T2DM (29,21) was statistically significant in regard to control group (27,28).

It is noted analytical values of glucose (142,71), HbA1c (7,25) and triglycerides (159,04) are higher in study population, but not statistically difference was observed.

In diabetic population prevalence of hypertension (78,05%), obesity (32,47%), dyslipidemia (64,63%) and peripheral artery disease (21,25%), turned out to be significantly higher than the other variables associated with diabetes collected.

Adverse Event	Control (%)	T2DM (%)
Accidental Removal	4,64	2,44
Occlusion	13,25	23,17
Pain	0	3,66
Chemical phlebitis	0	2,44
Mechanical phlebitis	3,31	0
Catether related infection	7,95	6,1
Skin reaction	0	1,22
Deep vein thrombosis	0,66	0
Extravasation	1,99	3,66

Based on T-test/ U Mann- Whitney P value <0,05

Table 1. Midline Individual Adverse Events

Duration of midlines in the T2DM group was lower (14.40 days) compared to the control group (16.13 days)

No differences were observed in the administered treatment between the two groups. Most of the catheters studied were removed at the end of treatment in both groups (control: 68.21%; T2DM: 57.32%).

The main adverse effects observed in Midlines are represented in **Table 1**. It should be noted that obstruction, pain and extravasation complications were significantly higher in the study group, while complications related to phlebitis and infection were higher in the control group.

Conclusion

- Midlines are a safe option for the administration of intravenous treatments in both study population.
- Obstruction is the most significantly prevalent vascular access complication. In almost a quarter of T2DM patients this was the reason for withdrawal.
- It remains to be clarified (still under development) if complications associated with diabetes may affect the maintenance of peripheral venous access devices in T2DM group.

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