

MEDICO-ECONOMIC APPROACH FOR CATHETERS MIDLINE COMPARATIVE STUDY : MIDLINES VERSUS PIV VERSUS PICC LINES

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LINKS OF INTEREST



Dr ROSAY

- BD
- VYGON



Mme METO

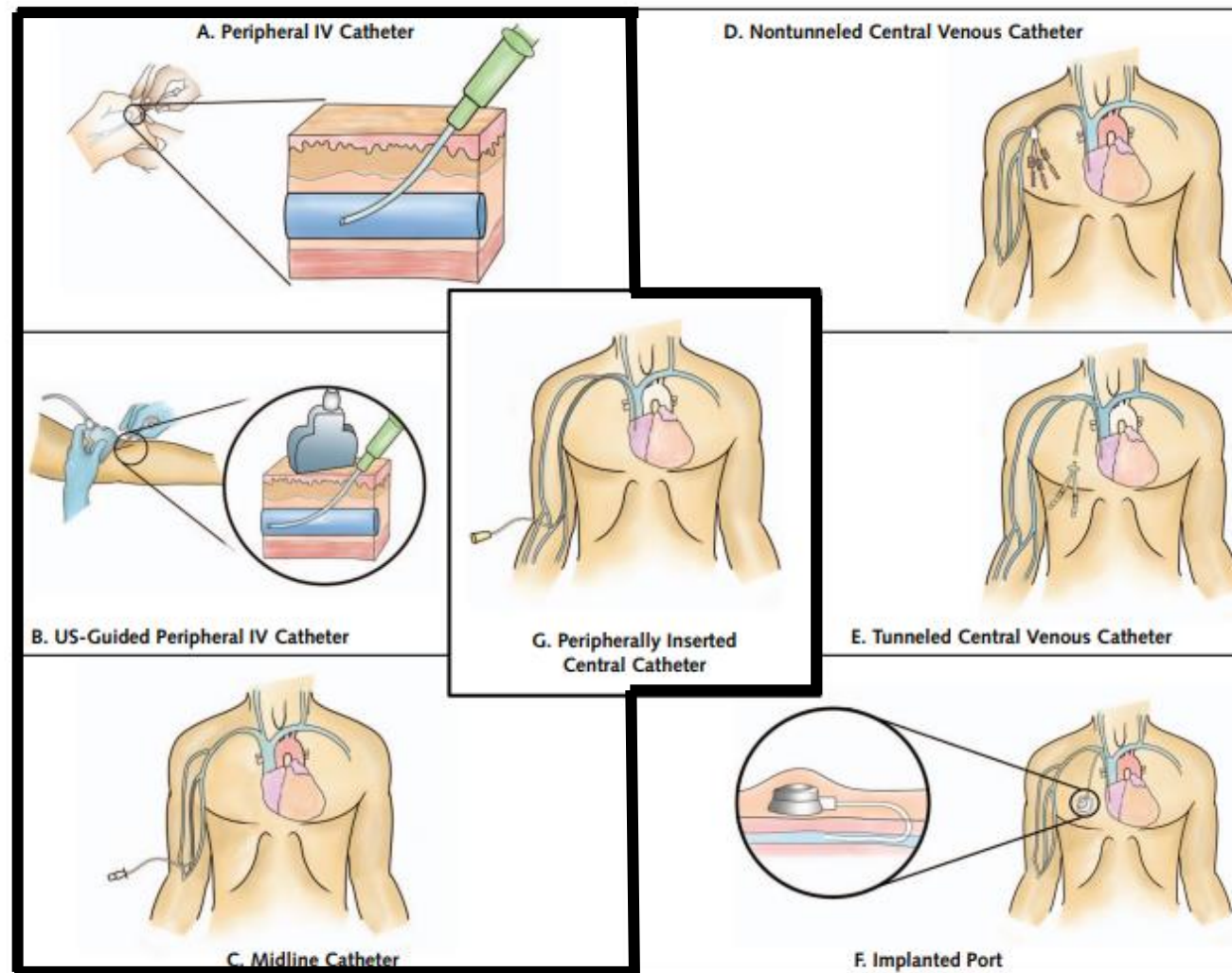
- CNAM
- VYGON



Dr EL HAJJAM

- VYGON

DIFFERENT DEVICES: PERIPHERAL INFUSATE COMPATIBLE



PERIPHERAL INFUSATE COMPATIBLE

CHOOSE THE BEST CATHETER IS DIFFICULT

- Treatment compatible.
- Length of treatment
- Complications
- Nuanced guidelines



GAVECELT

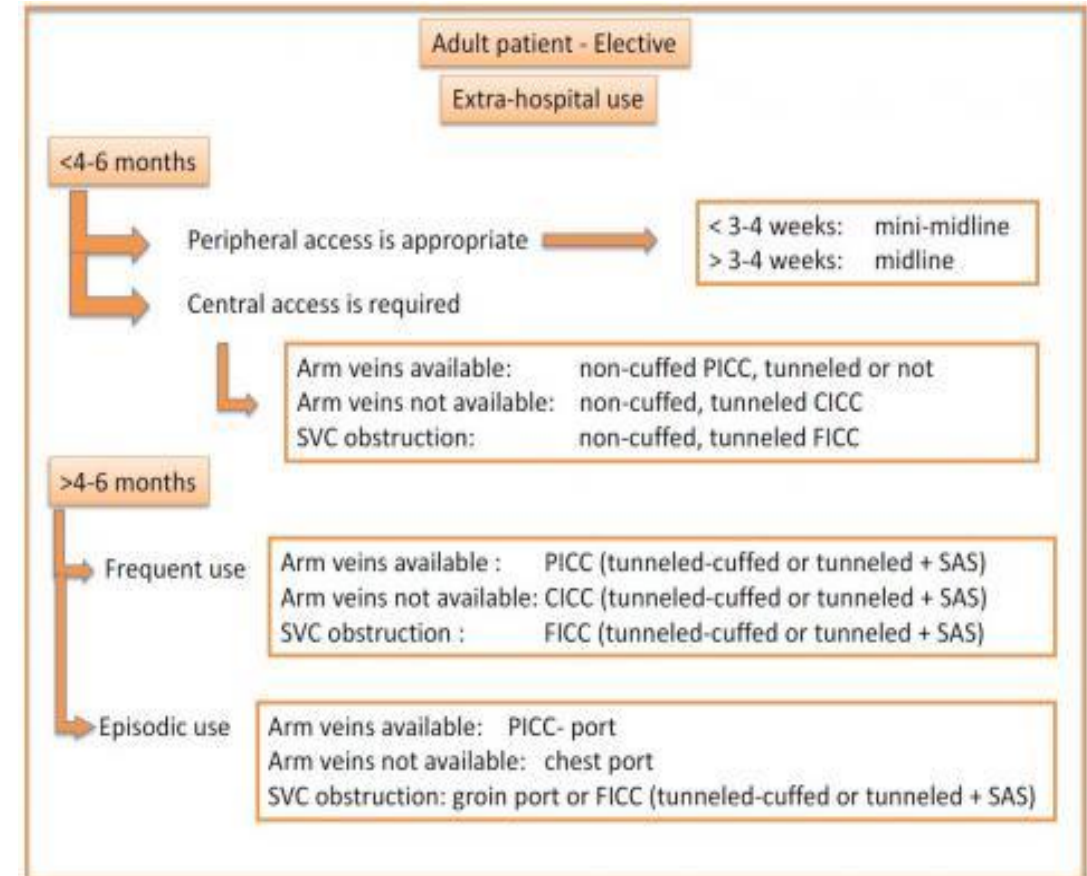
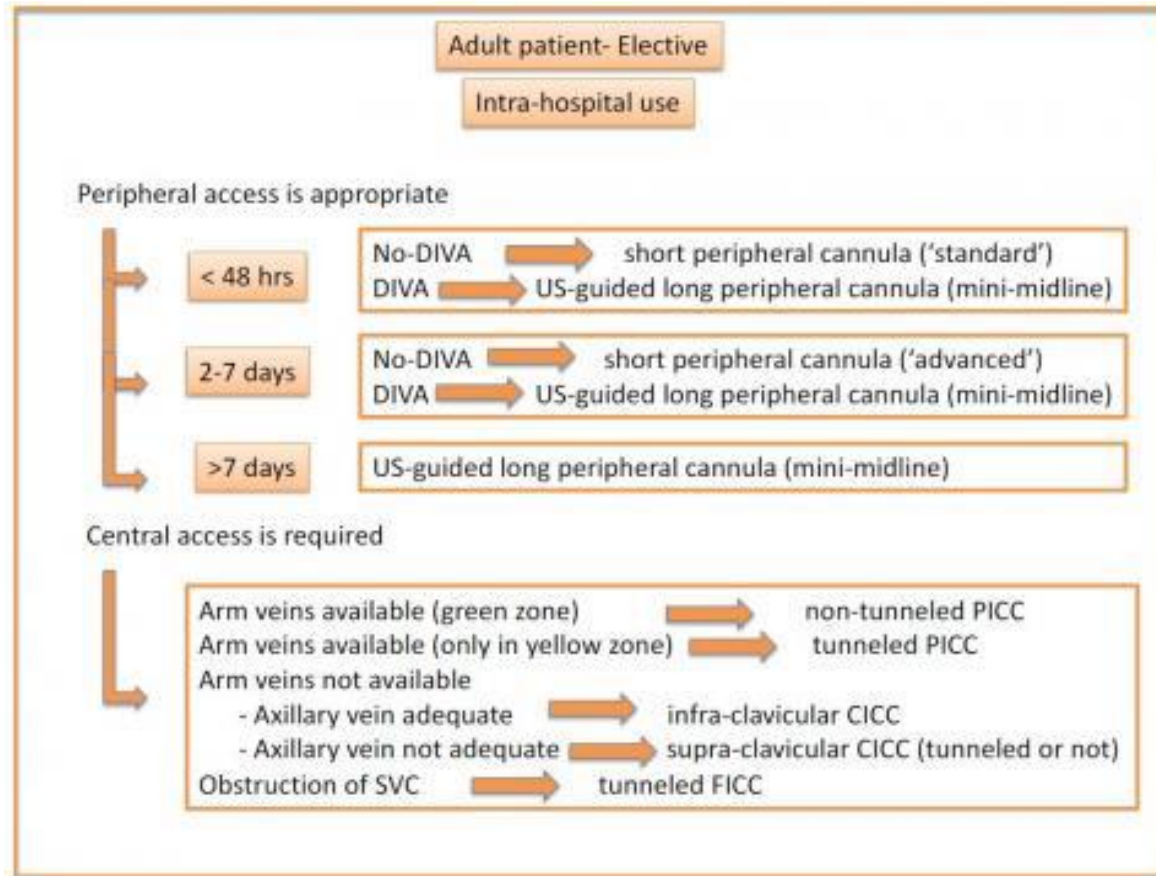




Figure 3. Venous access device recommendations for infusion of peripherally compatible infusate.

Device Type	Proposed Duration of Infusion			
	≤5 d	6–14 d	15–30 d	≥31 d
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheters for use ≤5 d			
US-guided peripheral IV catheter	US-guided peripheral IV catheter preferred to peripheral IV catheter if proposed duration is 6–14 d			
Nontunneled/acute central venous catheter	Central venous catheter preferred in critically ill patients or if hemodynamic monitoring is needed for 6–14 d			
Midline catheter	Midline catheter preferred to PICC if proposed duration is ≤14 d			
PICC		PICC preferred to midline catheter if proposed duration of infusion is ≥15 d		
Tunneled catheter				PICC preferred to tunneled catheter and ports for infusion 15–30 d
Port				

Appropriate

Neutral

Inappropriate

Disagreement

PROTOCOLE MICHIGAN USA

Annals of Internal Medicine

SUPPLEMENT

The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results From a Multispecialty Panel Using the RAND/UCLA Appropriateness Method

Vineet Chopra, MD, MSc; Scott A. Flanders, MD; Sanjay Saint, MD, MPH; Scott C. Woller, MD; Naomi P. O'Grady, MD; Nasia Safdar, MD, PhD; Scott O. Trerotola, MD; Rajiv Saran, MD, PhD; Nancy Moureau, BSN, RN; Stephen Wiseman, PharmD; Mauro Pittiruti, MD; Elie A. Akl, MD, MPH, PhD; Agnes Y. Lee, MD, MSc; Anthony Courney, MD; Lakshmi Swaminathan, MD; Jack LeDonne, MD; Carol Becker, MHA; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

17/10/2022

7



Guidelines for the Prevention of
Intravascular Catheter-Related
Infections, 2011

Naomi P. O'Grady, M.D.¹, Mary Alexander, R.N.², Lillian A. Burns, M.T., M.P.H., C.I.C.³ E

CDC 2011

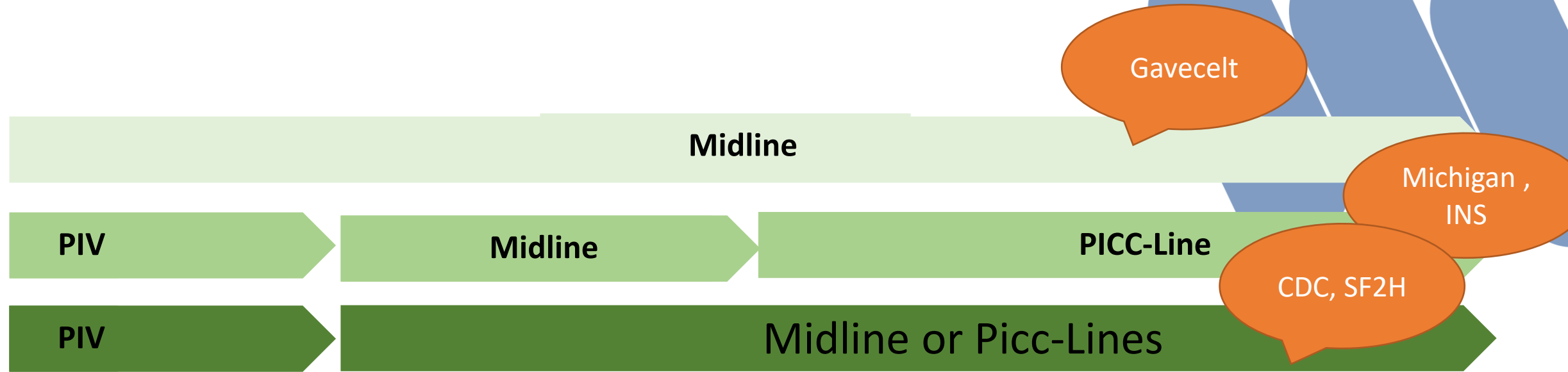
- Patient requiring 6 or more days of IV therapy should be assessed for a PICC or midline. **(Category 1B)**

INS 2021

- Patient requiring 6-14 days of IV therapy should be assessed for a midline. For those requiring more 14 days consider CVC; Midline may remain appropriate **(S74-6)**

SF2H 2013- 2019

Toutes disciplines confondues, un PICC ou un midline peuvent être proposés dès qu'un abord veineux fiable d'une durée attendue supérieure ou égale à 7 j consécutifs est nécessaire (à la place d'un accès périphérique) **(AF)**

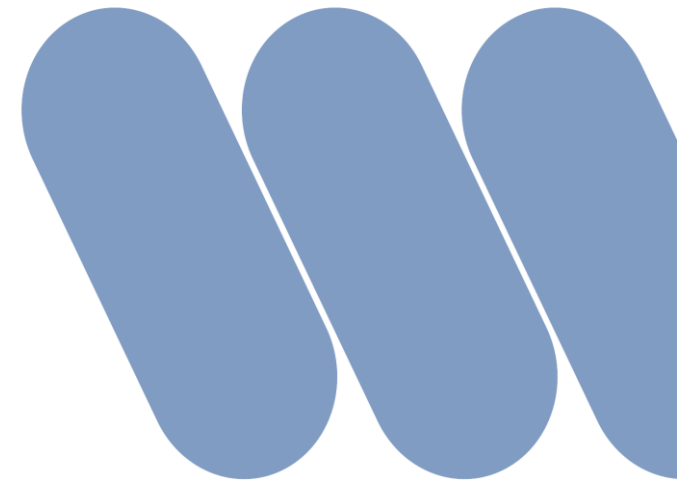


Duration of treatment

7
days

14
days

30
days









IS MEDICO-ECONOMIC APPROACH ABLE TO HELP THE PHYSICIAN TO CHOOSE THE GOOD CATHETER?

Not only the price of devices
But the cost of placement, the costs of complications



3 DIFFERENT CLINICAL SITUATIONS

Duration of the therapy (days)	Catheter			Indication
	PIV	Midline	PICC	
 7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Peritonitis 
 14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cystic fibrosis 
 21		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Meningitis 

Cost of device, cost of placement.

Cost of complications:

Treatment, Replacement of the device, Nursing time, Length of stay...



METHODS

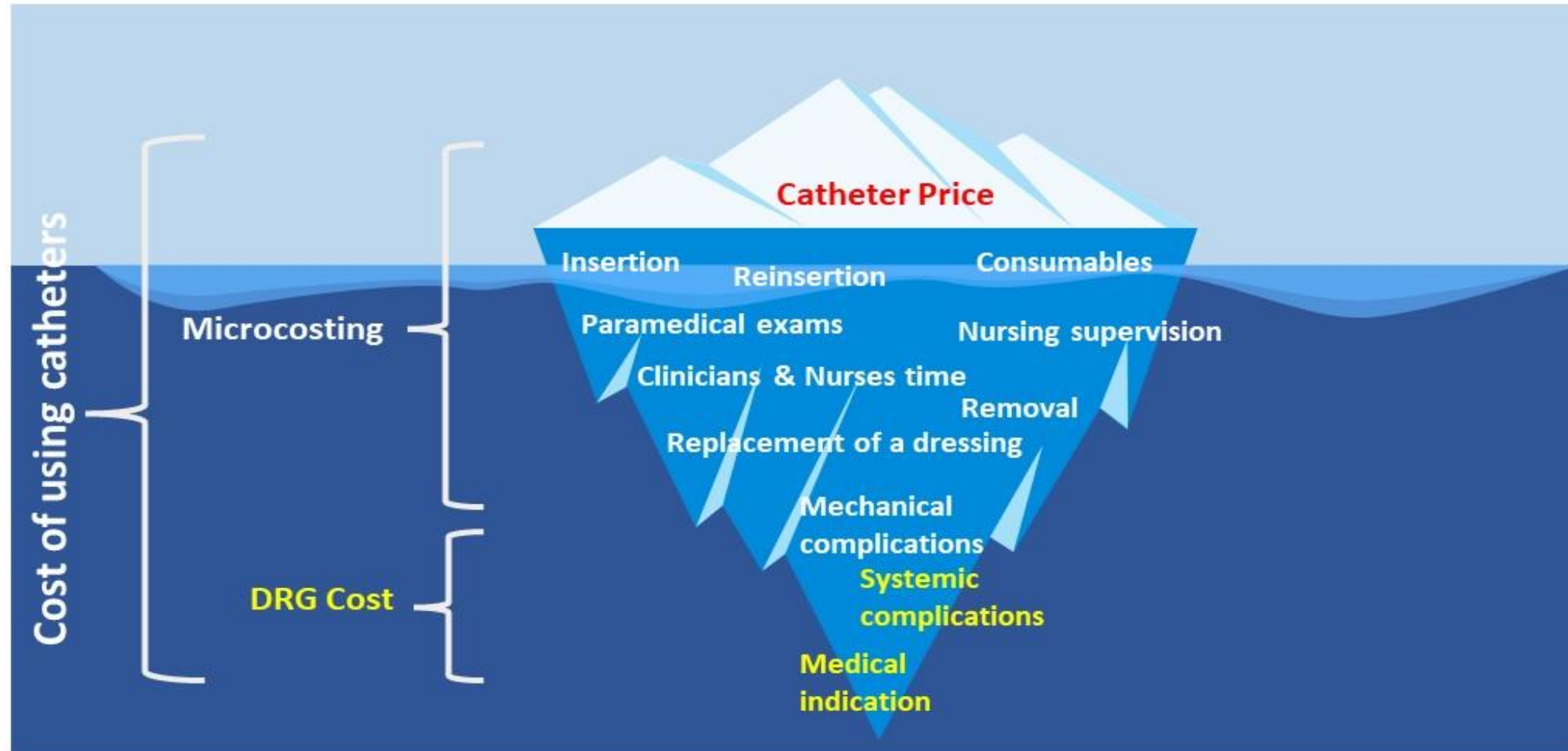


STRUCTURE OF THE STUDY

Economic assessment	Budget impact analysis (only cost)		
Perspective	Hospital perspective		
Decision modeling	Decision trees		
Time horizon	Cross section		
Comparators (devices)	PIV – Midline – PICC		
Length of treatment (days)	7	14	21
	<i>Peritonitis</i>	<i>Cystic fibrosis</i>	<i>Meningitis</i>



MODEL INPUT PARAMETERS – COST VALUATION



MODEL INPUT PARAMETERS - OCCURRENCE OF COMPLICATIONS (FREQUENCIES FROM A LITERATURE REVIEW)



<i>Complications</i> \ <i>Catheters</i>	PIV	Midline	PICC
<i>Systemic complications</i>			
Thrombosis	12,50% (Elia 2012)	4,10% (Tripathi 2021)	1,50% (Swaminathan 2021)
Bloodstream infection	0,1% (Maki 2006)	0,4% (Maki 2006)	1,8% (Swaminathan 2021)
Pulmonary embolism	0%	1,65% (Bahl 2019)	0,2% (Swaminathan 2021)
<i>Mechanical complications</i>			
Dislodgment	7,30% (Helm 2015)	5% (Tripathi 2021)	1,50% (Piredda 2020)
Infiltration	32% (Rickard 2012)	1,9% (Tripathi 2021)	0% (Xu 2020)
Catheter occlusion	22,80% (Helm 2015)	3,8% (Tripathi 2021)	5,8% (Swaminathan 2021)



RESULTS



MIDLINE VS PIV : 7-DAY TREATMENT

	ESTIMATED COST PER PATIENTPATIENT & PER PERIOD		INCREMENTAL COST
	MIDLINE	PIV	MIDLINE vs PIV
Micro-costing			
<i>Consumables</i>	€32,63	€5,40	€27,23
<i>Device</i>	€60,19	€1,94	€58,25
<i>Clinicians & Nurses time</i>	€42,42	€42,68	- €0,27
<i>Paramedical exams</i>	€15,76	€0,00	€15,76
<i>Mechanical complications</i>	€11,09	€37,35	- €26,25
Micro-costing total (I)	€162,09	€87,38	+ €74,71
DRG Cost			
<i>Ex : medical indication peritonitis</i>	€3 679,18	€3 679,18	€0,00
<i>Systemic complications</i>	€41,32	€239,99	- €198,67
Total DRG Cost (II)	€3 720,50	€3 919,17	- €198,67
Net Medical Cost (I)+(II)	€3 881,94	€4 006,31	- €123,95



MIDLINE VS PIV VS PICC : 14-DAY TREATMENT

	ESTIMATED COST PER PATIENT & PER PERIOD			INCREMENTAL COST	
	MIDLINE	PIV	PICC	MIDLINE vs PIV	MIDLINE vs PICC
Micro-costing					
<i>Consumables</i>	€45,66	€8,39	€45,71	€37,27	- €0,05
<i>Device</i>	€60,19	€3,02	€66,28	€57,17	- €6,09
<i>Clinicians & Nurses time</i>	€78,36	€75,45	€93,08	€2,92	- €14,71
<i>Paramedical exams</i>	€15,76	€0,00	€49,69	€15,76	- €33,93
<i>Mechanical complications</i>	€22,42	€59,35	€23,06	- €36,92	- €0,64
Micro-costing total (I)	€222,39	€146,20	€277,81	+ €76,20	- €55,42
DRG Cost					
<i>Ex : medical indication Cystic fibrosis</i>	€10 775,16	€10 775,16	€10 775,16	€0,00	€0,00
<i>Systemic complications</i>	€80,86	€368,84	€62,48	-€287,97	€18,38
Total DRG Cost (II)	€10 856,02	€11 144	€10 837,64	-€287,97	+€18,38
Grand GENERAL (I)+(II)	€11 078,42	€11 290,20	€11 115,46	- €211,78	- €37,04



MIDLINE VS PICC : 21-DAY TREATMENT

	ESTIMATED COST PER PATIENT & PER PERIOD		INCREMENTAL COST
	MIDLINE	PICC	MIDLINE vs PICC
Micro-costing			
<i>Consumables</i>	€58,69	€58,73	- €0,04
<i>Device</i>	€60,19	€66,28	- €6,09
<i>Clinicians & Nurses time</i>	€114,31	€128,99	- €14,68
<i>Paramedical exams</i>	€15,76	€49,69	- €33,93
<i>Mechanical complications</i>	€25,60	€23,30	€2,30
Micro-costing total (I)	€274,55	€327	- €52,45
DRG Cost			
<i>Ex : medical indication meningitis</i>	€9 286,52	€9 286,52	€0,00
<i>Systemic complications</i>	€94,23	€62,48	€31,75
Total DRG Cost (II)	€9 380,75	€9 349	+ €31,75
Grand GENERAL (I)+(II)	€9 655,30	€9 676	- €20,70



CONCLUSIONS

■ Midline is cheaper!

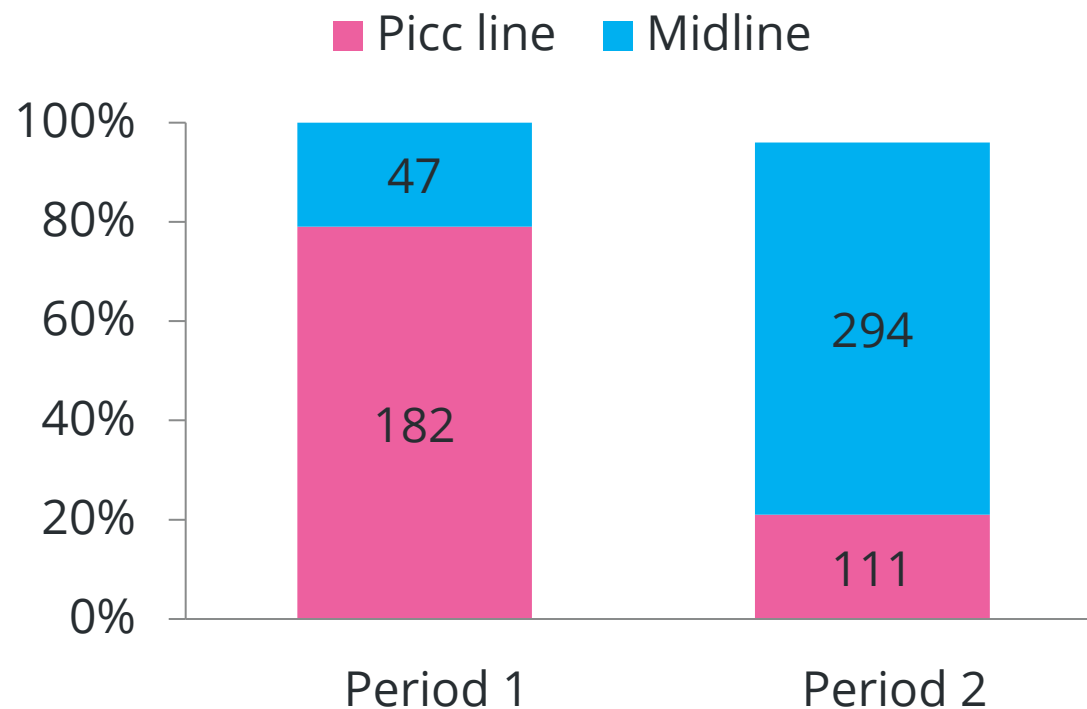
7 days	14 days		21 days
PIV : -€ 124	PIV: -€212	PICC: - €37	PICC: - € 21



CONCLUSION AND DISCUSSION

- Medico economic approach cannot and must not decide the choice of a medical device. However, in a strained economic context, this approach is important and can help the physician's choice
- **Despite a price 93 times higher than PIV, Midline is greatly cheaper than PIV for a 7 and 14 days treatments. Because of the rates and costs of complications, and mainly with the induced time-consuming of nurses and operators.**
- **Costs of Midlines and Picc-Lines for 14 and 21 days treatments are similar, lightly in favor on midline in this model.**
- This model can be discussed and results can differ between other hospitals. Prices of consumables, type of operators and methods of tip placement, rate of complications could influence results

Correct choice of the Catheter



Patients
satisfaction
98 %



Pertinence d'une équipe cathéters en court séjour auprès des personnes âgées - 25/08/20

Relevance of a catheter team for short stays with elderly people

Doi : 10.1016/j.sger.2020.03.007

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