



CINAS: a new tool for the classification of catheter function and lumen occlusion

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Introduction

- A well-functioning catheter
 - Easy injection, easy blood aspiration
 - Confirms safe access to the blood stream
 - Extremely important when using port catheters
- Catheter function assessment
 - Frequently performed ($> q1d$)
 - Important quality indicator
 - measure that affects patient's outcome





IN CLINICAL PRACTICE



- Not working well, partially blocked
 - Port blocked, unable to resolve occlusion
 - “bad” blood reflux

- Difficult infusion
 - 1 lumen, “difficult running”

- Aspiration/flush OK

Broviac 6.6F in VCR met behulp van guidewire, controle scopie, aspiratie/flush=OK.

pac verstopt, niet kunnen ontstoppen.
bij aanprikken PAC vlot inspuiten en reflux maar niet voldoende voor bloedname: wel al gestart met chemotherapie in afwachting van PAC team aangezien reflux ok

- 1 Lumen PICC loopt moeilijk, katheterteam gecontacteerd, komt vandaag nog langs.

Catheter function description

IN REPORTS

Catheter function is described vaguely, operationally and/or incompletely

- In clinical studies

There were 25 complications as follows: haematoma ($n = 9$), systemic infections ($n = 5$), obstruction ($n = 6$), ruptured membrane ($n = 2$), disconnection of

- In review articles

method to determine that a port is correctly accessed is a two-fold process: first obtain a substantial free flowing blood return, and then feel for the metal bottom of the port. Determining

- In guidelines

F. When administering a vesicant medication:

1. A low-pressure flow-control infusion device should be the instrument of choice.
2. Prior to administration, positive blood return should be confirmed and documented.

Complete description of the catheter function

- The catheter function should be described by both *the injection* and *the aspiration* ability

CINAS = Catheter INjection and ASpiration classificazione

Classification of the catheter function on a 1 to 3 scale

- 1 = facile
- 2 = difficile/ if nor easy, nor impossible
- 3 = impossibile
- X= non conosciuta

- Malfunction definition

“Any condition where, at least, injection or aspiration is no longer easy but has become difficult or impossible”

CINAS CLASSIFICAZIONE		INIEZIONE (IN)			
		FACILE ≥ 1 mL	DIFFICILE ≥ 1 mL	IMPOSSIBILE < 1 mL	NON CONOSCIUTA
		IN1	IN2	IN3	INx
ASPIRAZIONE (AS)	FACILE AS1 ≥ 3 mL	IN1AS1	IN2AS1	IN3AS1	INxAS1
	DIFFICILE AS2 ≥ 3 mL	IN1AS2	IN2AS2	IN3AS2	INxAS2
	IMPOSSIBILE AS3 < 3 mL	IN1AS3	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx

IN1AS1=
a well-
functioning
catheter

Defining malfunction types

There is no one type of catheter malfunction

1. Injection problems

- Difficult
- Impossible

→ combined without
or with aspiration problems

2. Aspiration problems

1. Difficult
2. Impossible

→ combined without
or with injection problems

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ASPIRAZIONE (AS)	FACILE AS1 ≥ 3 mL	IN1AS1	IN2AS1	IN3AS1	INxAS1
	DIFFICILE AS2 ≥ 3 mL	IN1AS2	IN2AS2	IN3AS2	INxAS2
	IMPOSSIBILE AS3 < 3 mL	IN1AS3	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx

Injection problems

- Suspected intraluminal occlusion

Aspiration problems

- Suspected extraluminal occlusion

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ASPIRAZIONE (AS)	FACILE AS1 ≥ 3 ML	IN1AS1	IN2AS1	IN3AS1	INxAS1
	DIFFICILE AS2 3 ML	IN1AS2	IN2AS2	IN3AS2	INxAS2
	IMPOSSIBILE AS3 < 3 ML	IN1AS3	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx

Clinical sign is an injection problem

- Total occlusion
 - Impossible injection combined with impossible aspiration (IN3AS3)
- Partial occlusion
 - Difficult injection combined with easy (IN2AS1), difficult (IN2AS2) or impossible (IN2AS3) blood aspiration
 - Rare cases: impossible injection combined with easy (IN3AS1) or difficult (IN3AS2) aspiration: *Reverse ball valve effect*

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	DIFFICILE AS2 ≥ 3 ML	IN1AS2	IN2AS2	IN3AS2	INxAS2
	IMPOSSIBILE AS3 < 3 ML	IN1AS3	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx



Causes of intraluminal occlusion

1. Clot formation
2. Lipid micelles trapped in fibrin deposits
3. Drug precipitates
4. Multifactorial



Exception: intraluminal occlusion by an external compression of the catheter or external catheter part
e.g. pinch-off or clamping of the external part of the catheter

Clinical sign is an aspiration problem

Partial occlusion

- An easy injection ability combined with difficult (**IN1AS2**) or impossible aspiration (**IN1AS3** = withdrawal occlusion)
- A difficult injection ability combined with difficult or impossible aspiration (IN2AS2, IN2AS3)

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	IMPOSSIBILE AS3 < 3 mL	IN1AS3	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx



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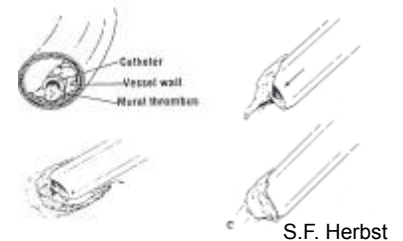
Causes of extraluminal occlusion

–Mechanical

- Catheter trajectory, tip location (X-Ray/linogram)

–Thrombotic/clot formation

- Catheter tip thrombosis (linogram)
- always suspected if catheter tip is correctly located!



–Sleeve formation

- Catheter tip embedded in fibrous sleeve (linogram)

–Multifactorial

CINAS in clinical practice

150 assessments during blood sampling in 111 oncology patients with ports

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ASPIRAZIONE (AS)	FACILE AS1 ≥ 3 mL	IN1AS1 93%	IN2AS1 3.3%	IN3AS1	INxAS1
	DIFFICILE AS2 ≥ 3 mL	IN1AS2 1.3%	IN2AS2 1.3%	IN3AS2	INxAS2
	IMPOSSIBILE AS3 < 3 mL	IN1AS3 0,7%	IN2AS3	IN3AS3	INxAS3
	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx

- A well functioning catheter: 93% (n=140)
- Blood aspiration problems with easy injection
 - IN1AS2= 1.3% (n=2)
 - IN1AS3= 0.7% (n=1)
- Difficult injection with easy or difficult blood aspiration
 - IN2AS1= 3.3% (n=5)
 - IN2AS2= 1.3% (n=1)

Implementation of the CINAS in our hospital

Acties Dossier 

Huidtumoren: Premaligne en maligne huidafwijkingen

Con Probleem KBest Waar PO ECG Medi
Acta Afsp MVer Verw Labo Rx Zo

   + Bij ontslag: apotheek verwittigen voor home TPN. | **LINKER arm NIET gebruiken voor bloedname, bloedd**

Overzichtstabel Grafieken Historiek zorgplannen Vochtbalans Overzichtstabel (arts) CTCAE Nevenwerkingen Verslag D

Vernieuw Registratie Planning Bulk Zorgplan  14-06-2015     ☐ Toon e
*** Toon Alle Zorgen ***  Groepeer

AMO - Algemeen		Zo 14-06-2015			
		O	A	N	O
 Observatie CVK - GVK - PICC (PICC, Arm links)					8u: 2 lumen Wit: IN1AS1 Rood: IN3AS3



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The CINAS classification

- Provides a uniform and accurate language to describe the catheter function
 - in clinical practice AND for research purposes
- Easy
 - to learn: only basic instructions needed on the scoring modalities
 - to implement in electronic patient files for documentation/reporting
- No extra time requirements for the assessment

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	NON CONOSCIUTA ASx	IN1ASx	IN2ASx	IN3ASx	INxASx

More information on the CINAS:

<https://www.uzleuven.be/cinas>

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Goossens G.A. et al. Diagnostic accuracy of the Catheter INjection and ASpiration (CINAS) classification for assessing the function of totally implantable venous access devices, Journal of Supportive Care in Cancer, 2015 Jul 26, DOI 10.1007/s00520-015-2839-x.