

HAIDI

u dialyzovaných pacientov

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Oddelenie cievnej chirurgie NsP FDR BB
Chirurgické oddelenie NsP FDR Žilina

Definícia

- Ischémia ruky na podklade periférnej hypoperfúzie indukovanej hemodialyzačnou AVF/AVG
- 1. krát popísana v roku 1969 po vytvorení AVF CB
(STOREY)

- HAIDI - Haemodialysis Access Induces Distal Ischemia
- DASS - Dialysis Access Steal Syndrome
- DHIS - Distal Hypoperfusion Ischemia syndrome
- AVAIS - Arteriovenous Access Ischemic Steal

Incidenca

- Asymptomatický steal syndróm 70-90 %
- Symptomatická ischémia 10-20 %
- Ischémia vyžadujúca liečbu 1 - 4 %
- „upper arm“ AVF / AVG 5%
- „forearm“ AVF / AVG 1,8 %
- AVF > AVG

AVAIS

- Akútna ischémia do 24 hodín
- Subakútna ischémia do 1 mesiaca
- Chronická ischémia nad 1 mesiac

AVG

skôr ~ 2 dni

AVF

neskôr ~ 150 dní

Rizikové faktory AVAIS

Neexistujú dôkazy, ktoré by dokázali jednoznačne určiť rizikovú skupinu, v ktorej sa AVF nedá urobiť pre vysoké riziko AVAIS

Príčiny AVAIS

- Inflow stenóza
- Slabé arteriálne kolaterály
- Slabý run off
- Vysoký prietok AVF

Diagnostika

- Klinický obraz
- CCDUS - zmeranie Qa !!!!!!!
- DSA
- BDP - basal digital pressures < 60 mm Hg,
DPI - digital - contralateral brachial index < 0,4
tcPO2 < 40 mm Hg

Klinický obraz

- Chlad prstov, ruky
- Bledosť, cyanóza
- Slabosť, stuhnutosť, nešikovnosť prstov
- Parestézie prstov
- Bolesti
- Ischemický ulcer/gangréna

Diagnóza AVAIS je hlavne na základe klinického obrazu



CCDUS

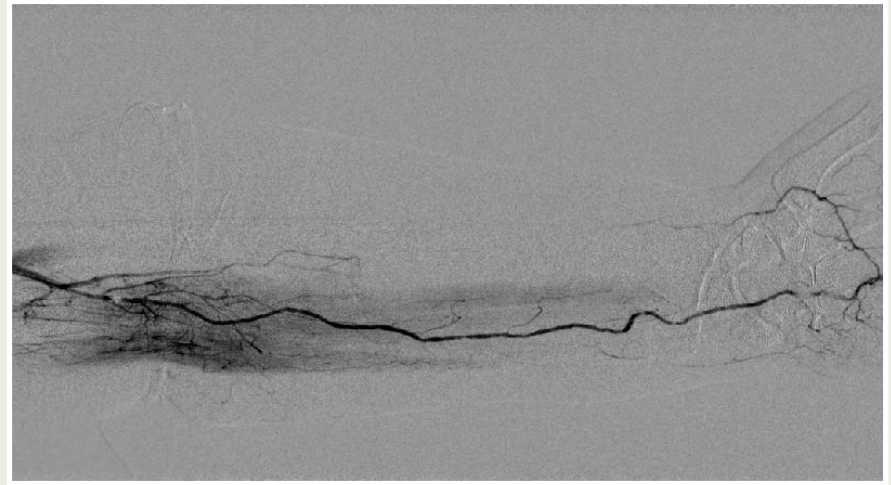
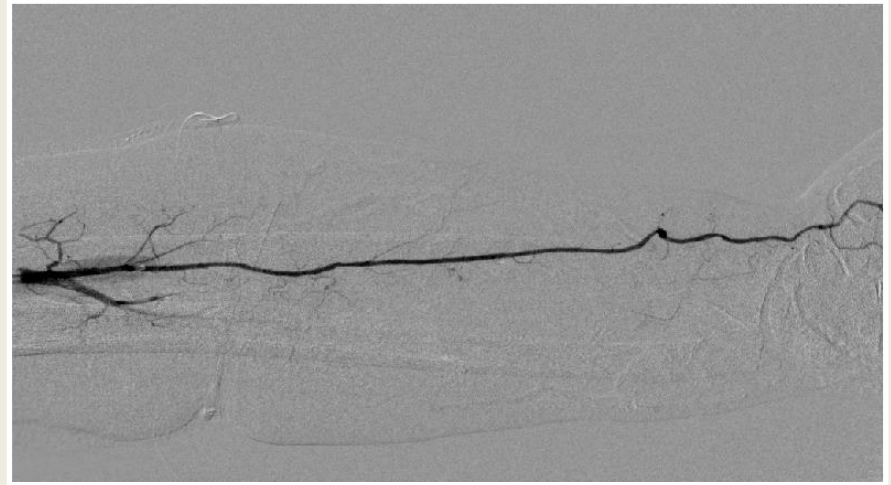
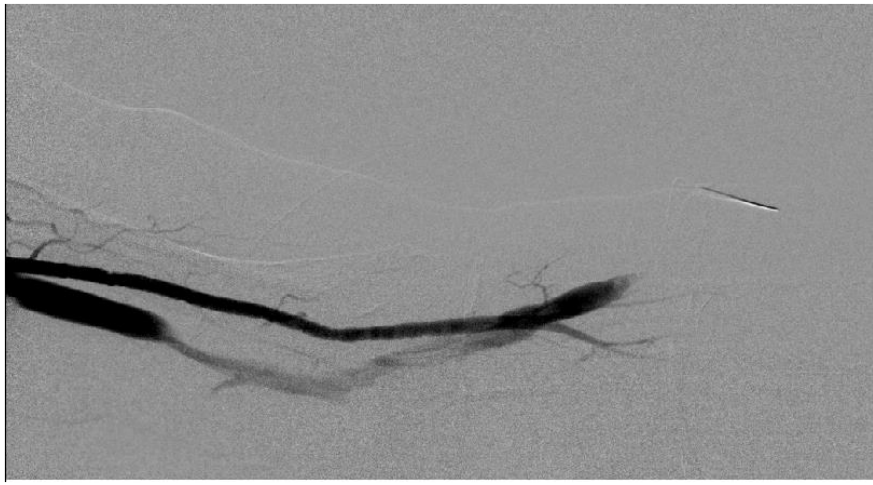
Meranie Q_a

Proximálna stenoza

Distálny outflow



DSA



Klasifikácia

TABLE III - The Vascular Access at Charing Cross (VA@CX) Classification of arteriovenous access ischaemic steal (AVAIS)

Stage	Symptoms	Signs	Investigations	Suggested treatment options
Grade 1	Mild symptoms or signs alone	Pale or blueish nail beds, mild coldness of skin of hand, reduced arterial pulsations at wrist	Reduced finger pressures <contralateral side but DBPI >0.4; DUS shows high or normal access flow.	Observation and review
Grade 2a	Symptoms (<i>tolerable</i> pain cramps, paraesthesia, numbness or coldness). During dialysis or intense use of the hand:	Pale or blue-ish nail beds, coldness of skin of hand, reduced arterial pulsations at wrist	Reduced finger pressures (DBPI <0.4): DUS shows high or normal access flows. Angiography may demonstrate arterial stenosis proximal to the anastomosis ± collateral and ± run-off disease	If high flow, treat by banding/DRIL/RUDI and treat underlying arterial disease where possible. If low flow PAI or tie off may be required.
Grade 2b	Symptoms (<i>intolerable</i> pain cramps, paraesthesia, numbness or coldness). during dialysis or normal use of the hand	Pale or blue-ish nail beds, coldness of skin of hand, reduced arterial pulsations at wrist	Reduced finger pressures (DBPI <0.4): DUS shows high or normal access flows. Angiography may demonstrate arterial stenosis proximal to the anastomosis ± collateral and ± run-off disease	If high flow, treat by banding /DRIL/RUDI and treat underlying arterial disease where possible. If low flow, treat any underlying arterial disease and PAI or tie off may be required.
Grade 3	Rest pain or motor dysfunction of fingers or hand.	Pale, white or blue-ish nail beds and skin, coldness of hand, reduced arterial pulsations at wrist	Reduced finger pressures (DBPI <0.4): DUS shows high or normal access flows. Angiography may demonstrate arterial stenosis proximal to the anastomosis ± collateral and ± run off disease	Definitive treatment is required and should be tailored to all causative factors (Tie off/DRIL/PAI/ angioplasty)
Grade 4	Rest pain and or paraesthesia.Loss of sensation (numbness).	Tissue loss (ulceration, necrosis). Motor and sensory loss.	Reduced finger pressures (DBPI <0.4): DUS shows high or normal access flows. Angiography may demonstrate arterial stenosis proximal to the anastomosis ± collateral and ± run off disease	Definitive treatment is required and should be tailored to all causative factors (Tie off/DRIL/PAI/ angioplasty) and debridement/amputation may be required
Grade 5	Irreversible tissue loss of the hand.	Extensive tissue loss	Reduced systolic finger pressures (DBPI <0.4): DUS shows high or normal access flows. Angiography may demonstrate arterial stenosis proximal to the anastomosis ± collateral and ± run off disease. X ray may show bone loss/osteomyelitis	Treatment should be attempted but amputation/debridement of necrotic areas required and abandonment of access may be necessary although underlying arterial disease amenable to treatment should be attempted.

Based on previous classifications and staging schemata by Tordoir et al (6), Scheltinga et al (23).

DBPI = digital:brachial pressure index; DRIL = distal revascularisation interval ligation; PAI = proximalisation of the access inflow; DUS = Doppler ultrasound.

Čo ovplyvňuje liečbu AVAIS ???

- Štádium 2b je indikáciou k riešeniu
- Lokalizácia AVF / AVG
- Príčina
- Rozsah ischémie
- Potenciálna potreba HD prístupu
- Má pacient iné možnosti HD prístupu
- Komorbidity
- Má pacient vhodný konduit na rekonštrukciu

Proximal AVF

Stenóza
prox.artérie

EVL

Bez stenózy

> 1500

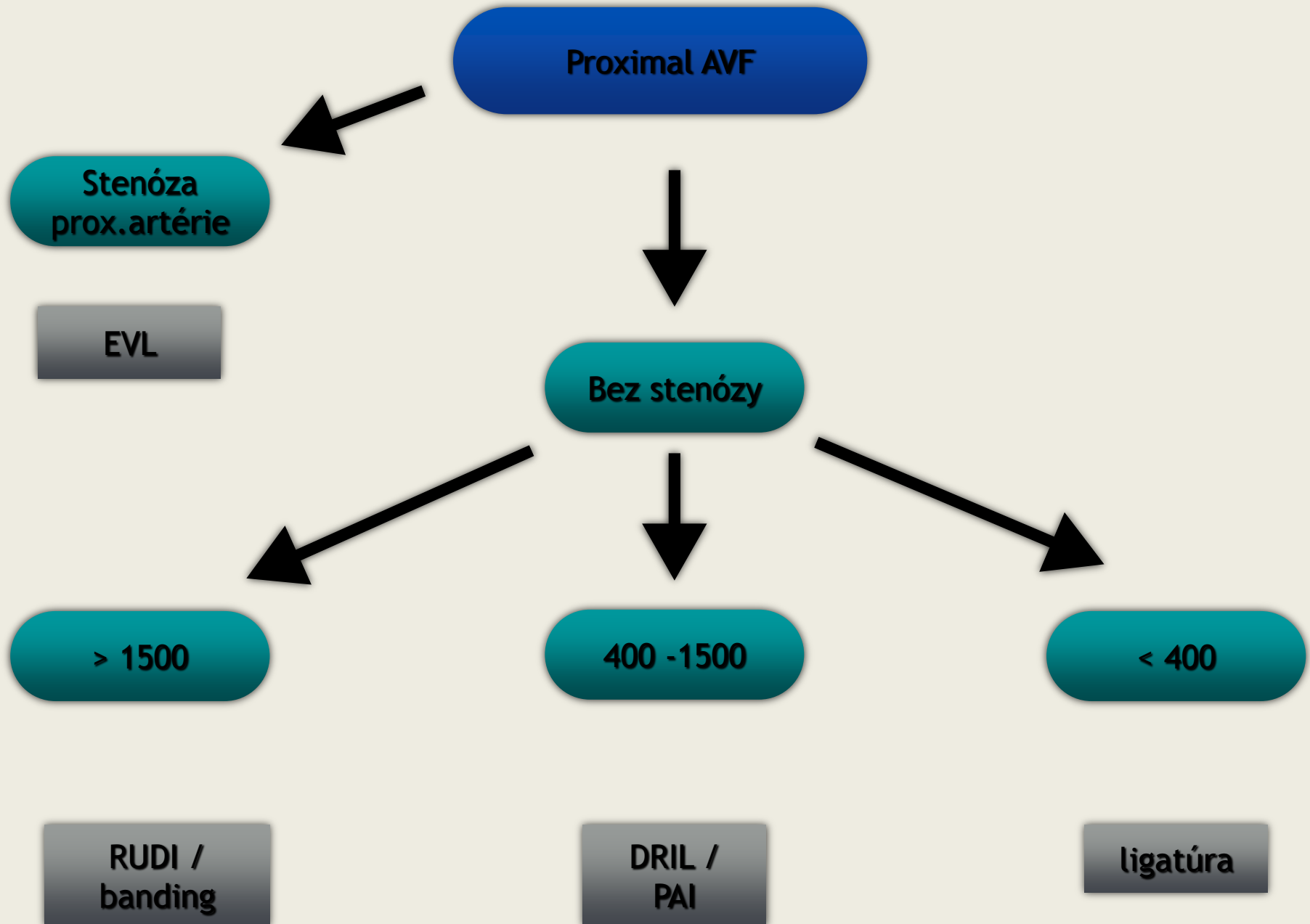
400 -1500

< 400

RUDI /
banding

DRIL /
PAI

ligatúra



Distal AVF

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graph TD; A[Distal AVF] --> B[Stenóza prox.artérie]; A --> C[Bez stenózy]; B --> D[PTA]; C --> E[400 -1000]; C --> F[< 400]; E --> G[DRAL]; F --> H[ligatúra];
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A flowchart starting with 'Distal AVF' in a blue rounded rectangle. Two arrows point down from it. The left arrow points to 'Stenóza prox.artérie' in a teal rounded rectangle, which then points to 'PTA' in a grey rectangle. The right arrow points to 'Bez stenózy' in a teal rounded rectangle. From 'Bez stenózy', two arrows point down to '400 -1000' and '< 400' in teal rounded rectangles. '400 -1000' points to 'DRAL' in a grey rectangle, and '< 400' points to 'ligatúra' in a grey rectangle.

Stenóza
prox.artérie

PTA

Bez stenózy

400 -1000

DRAL

< 400

ligatúra

Typy výkonov

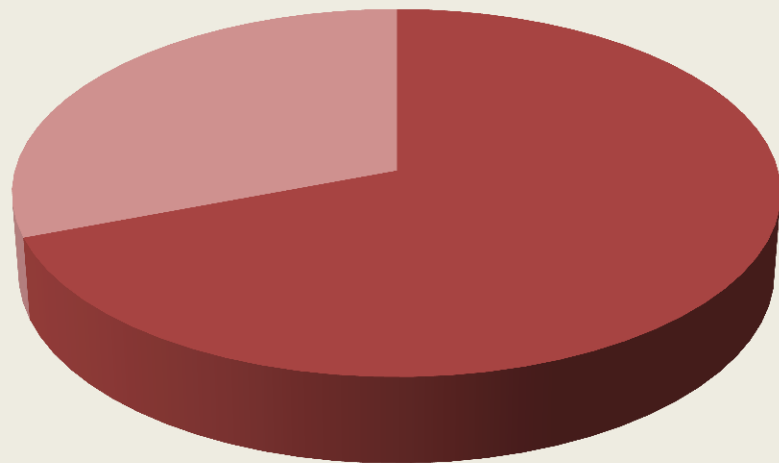
- Redukcie prietoku : banding, anastoplastika, PRAL, RUDI
- DRAL - distal radial artery ligation
- PAI - proximalisation arterial inflow
- DRIL- distal revascularisation interval ligation
- Ligatura AVF

OCCH BB 2015-2017

- 26 pacientov 2b-5
- Priemerný vek 65,9 R (43 - 84)
- 2 x akútny AVAIS
- 24 x chronický AVAIS
- 4 x AVC RC
- 22 x AVF cubiti
- 11 pacientov po AVF v BB
- U 3 z nich už pred AVF vyslovene podozrenie na vznik AVAIS

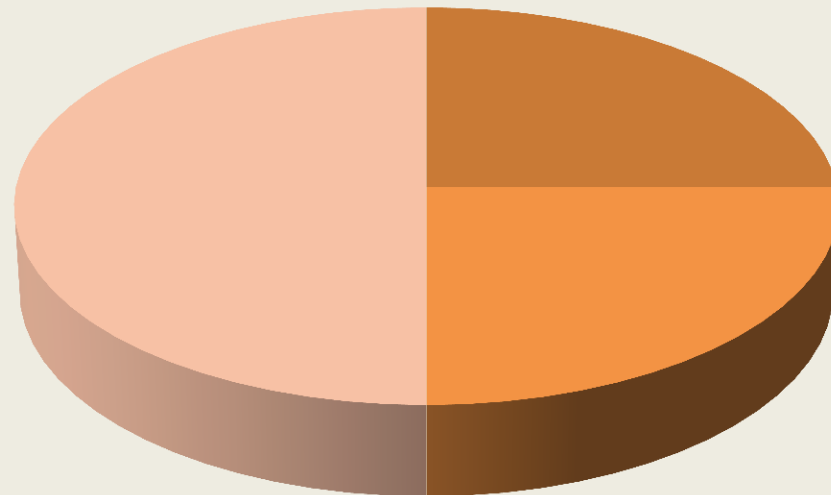
Charakteristika súboru N=26

DM



■ DM+ ■ DM-

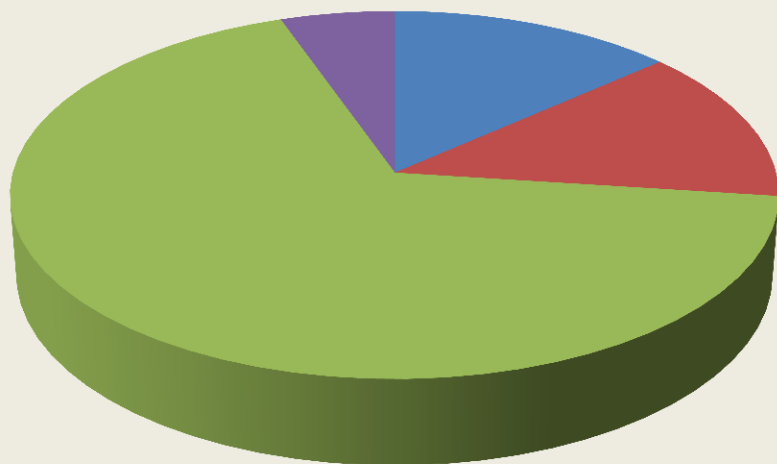
PAO DKK



■ PAO+ ■ Amputácia ■ PAO-

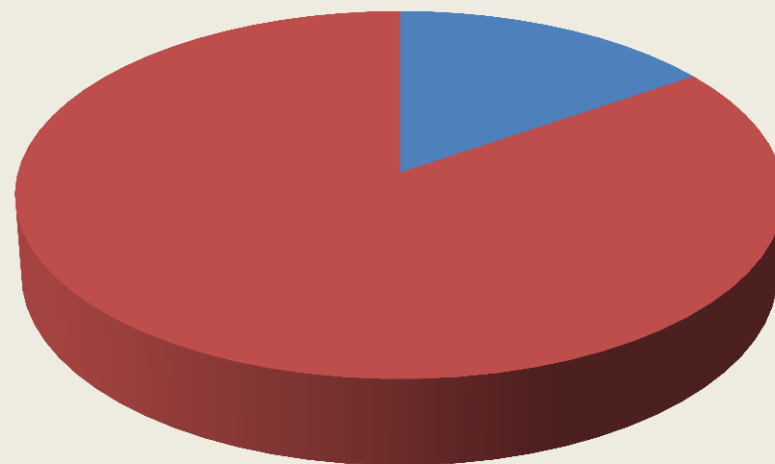
Charakteristika súboru N=26

AV@CX



■ 2b ■ 3 ■ 4 ■ 5

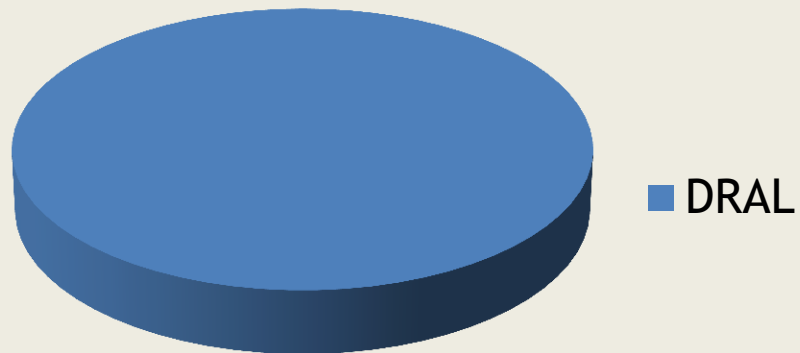
Lokalizácia AVF



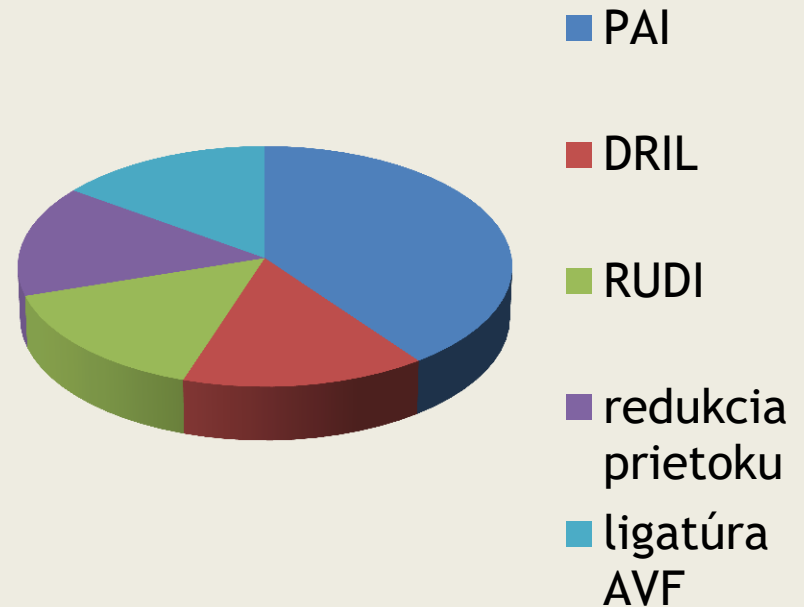
■ AVF RC ■ AVF cubiti

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AVF RC



AVF cubiti



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- Operačné výkony

• PAI	8
• DRIL	3
• RUDI	3
• Bandáž AVF	2
• Anastoplastika	1
• Ligatúra AVF	5

Výsledky

- 22 x rekonštrukcia AVF
- 20 x úľava , resp.zhojenie defektu
- 1 x neúspech (infekcia graftu)
- 2 x len čiastočný efekt (4b....2a, 3)
- 6 x ligatúra AVF (5 + 1)

Indikácie k ligatúre AVF

- Akútny AVAIS
- 5. štádium AVAIS
- Ťažká kardiálna komorbidity
- Neúspech rekonštrukcie
- Prianie pacienta

Arteriovenous access ischemic steal (AVAIS) in haemodialysis: a consensus from the Charing Cross Vascular Access Masterclass 2016

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ABSTRACT

Arteriovenous access ischaemic steal (AVAIS) is a serious and not infrequent complication of vascular access. Pathophysiology is key to diagnosis, investigation and management. Ischaemia distal to an AV access is due to multiple factors. Clinical steal is not simply blood diversion but pressure changes within the adapted vasculature with distal hypoperfusion and resultant poor perfusion pressures in the distal extremity. Reversal of flow within the artery distal to the AV access may be seen but this is not associated with ischaemia in most cases. Terminology is varied and it is suggested that arteriovenous access ischemic steal (AVAIS) is the preferred term. In all cases AVAIS should be carefully classified on clinical symptoms as these determine management options and allow standardisation for studies.

Diabetes and peripheral arterial occlusive disease are risk factors but a 'high risk patient' profile is not clear and definitive vascular access should not be automatically avoided in these patient groups.

Multiple treatment modalities have been described and their use should be directed by appropriate assessment, investigation and treatment of the underlying pathophysiology. Comparison of treatment options is difficult as published studies are heavily biased. Whilst no single technique is suitable for all cases of AVAIS there are some that suit particular scenarios and mild AVAIS may benefit from observation whilst more severe steal mandates surgical intervention.

Keywords: Access, AVAIS, Dialysis, Fistula, Ischaemia, Steal

Introduction

A master class on was held at the Vascular Access at Charing Cross (VA@CX2016) conference in April 2016 with invited experts and active audience participation to discuss arteriovenous vascular access-induced steal syndrome a serious complication yet not uncommon complication of vascular access.

The overall spectrum of pathophysiology, investigation, diagnosis and treatment of haemodialysis-associated ischaemia was presented from up-to-date evidence and personal experience by the listed authors and discussed as an open audience forum.

The resultant discussion led to a proposal for a state-of-the-art consensus document on the subject to allow unification of terminology, development of best practice and objective presentation of the evidence base.

Pathophysiology and mechanisms

Creating of an arteriovenous fistula (AVF) for haemodialysis by the anastomosis of a vein directly (end-to-end or end-to-side), or via a graft to an artery creates an abnormal non-anatomic vascular circuit where a high-pressure low-volume flow artery (typically 50 to 100 mL/min) is suddenly changed to a high-flow low-resistance system (1, 2).

Accepted: August 28, 2016

Published online: October 12, 2016

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pozornost'