S krémom alebo bez?

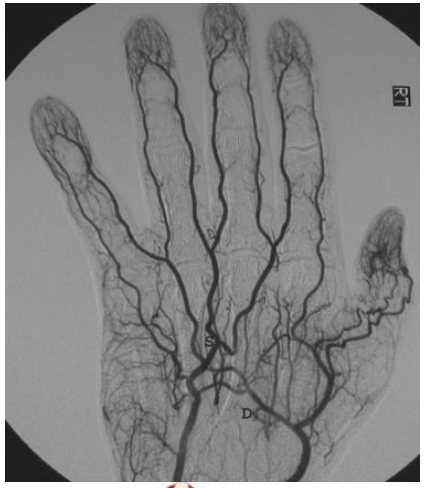
Arteriálne katétre u detí a spôsoby liečby komplikácii

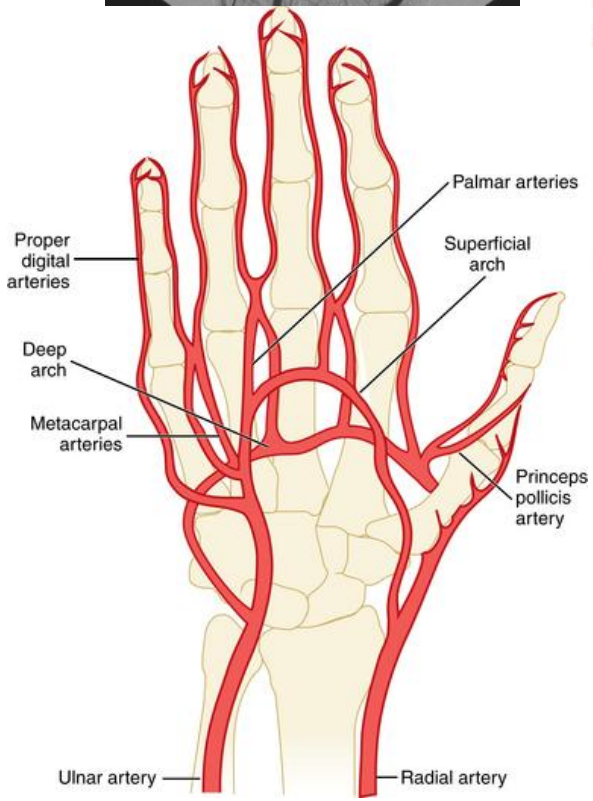
H. Tovt, B.Lomnická, J.Čutora

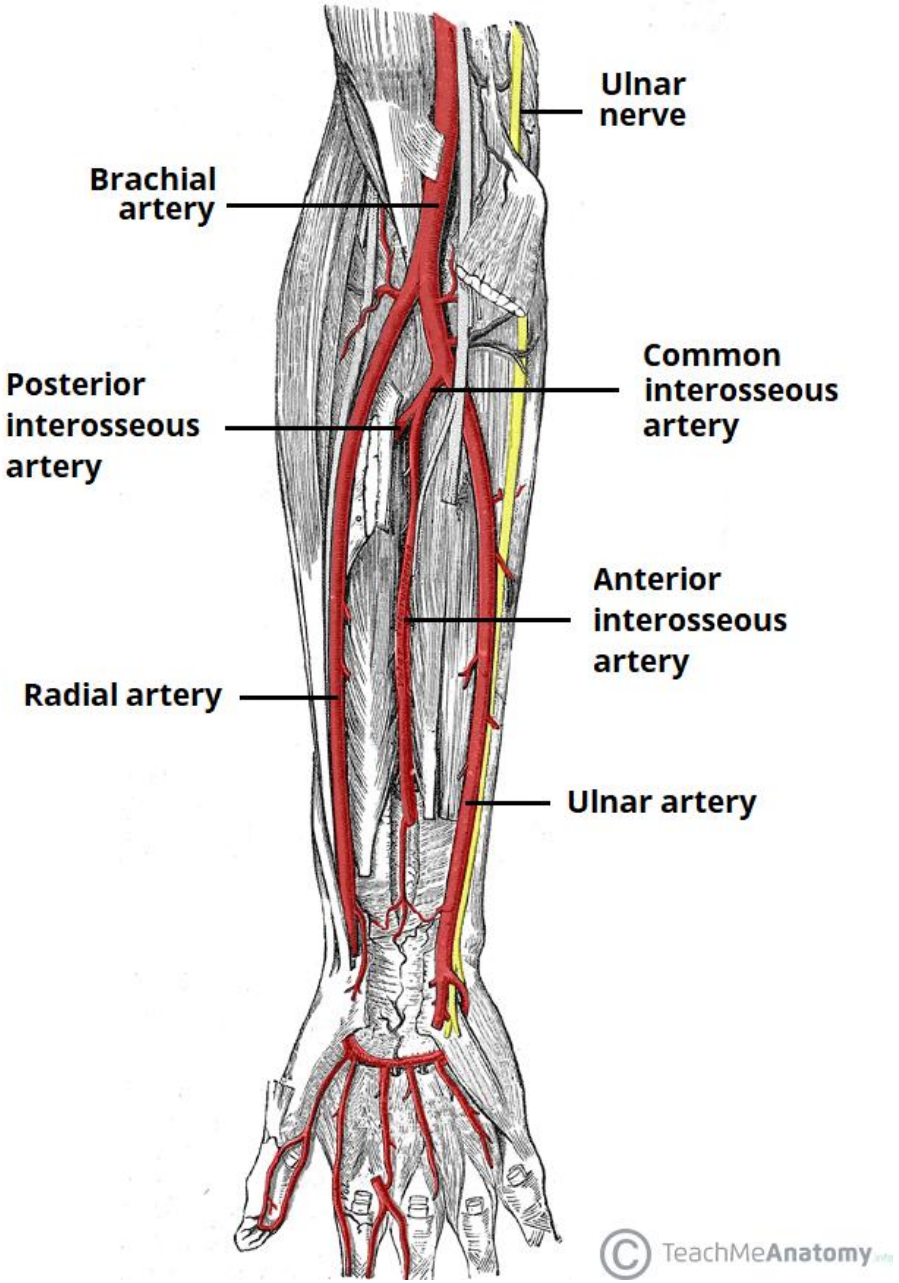
Čestné vyhlásenie o neprítomnosti konfliktu záujmov

Kanylácia artérie u detí:

- Dôvody kanylácie
- Hlavné odlišnosti dospelí vs. deti
- Technické možnosti
  - landmark + palpácia
  - USG
- Princípy bezpečnej kanylácie
  - USG – out of plane
  - ZIM – zone insertion method
- Fixácia
- Komplikácie a metódy ich terapie







Arteriálna linka

- PICU
- OP – brušná, hrudná chirurgia, VVCH, trauma,...
- Odbery krvi
- Kontinuálny monitoring iBP
- Hemodynamický monitoring

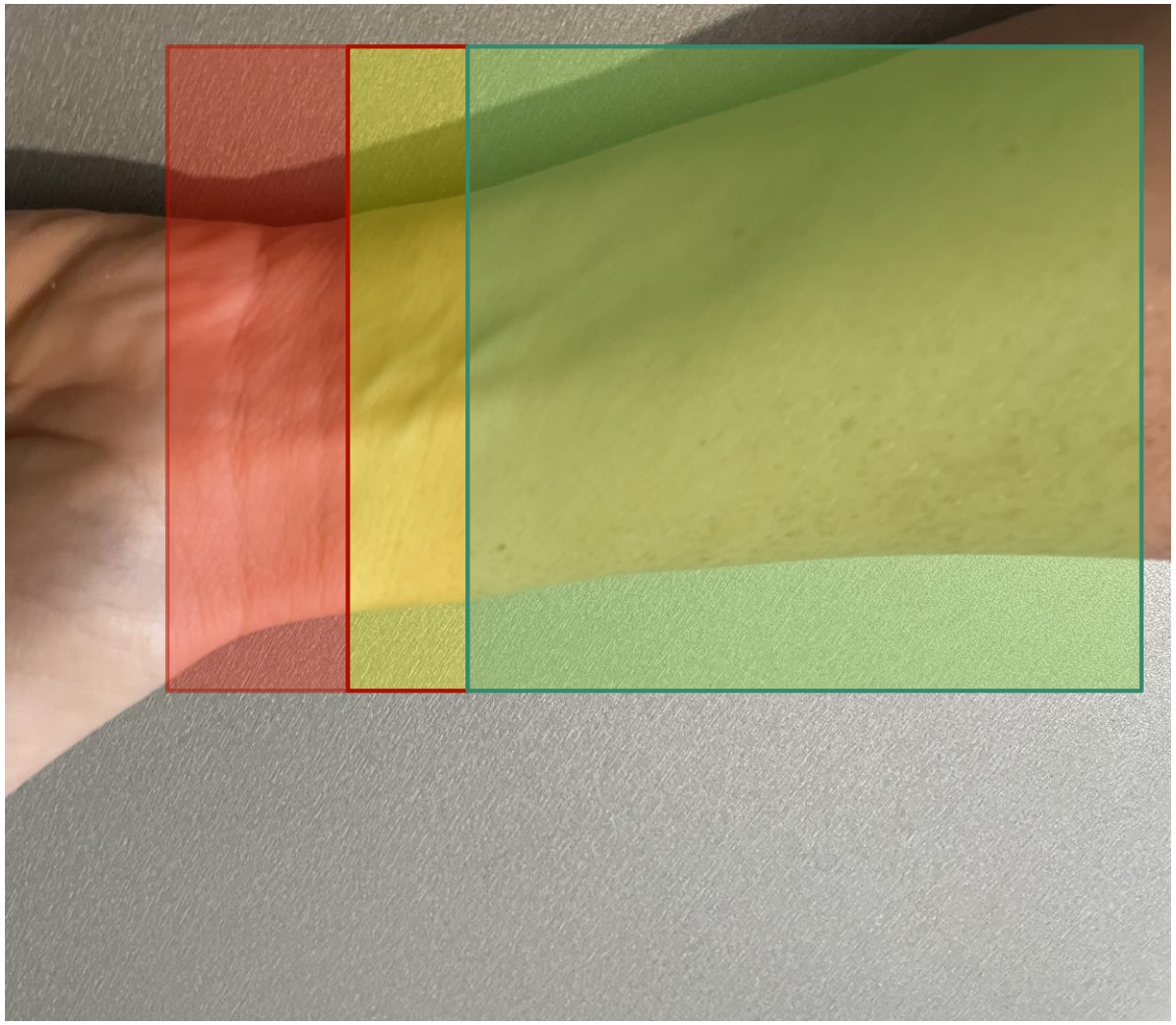
Dospelí vs. deti

- Anatomické rozdiely: menší priemer ciev
- Fyziolofické rozdiely: nižší TK
- Časté zlyhanie kanylácie “naslepo”
- Nutnosť sedácie/anestézy počas inzercie
- Problematická fixácia

Možnosti kanylácie

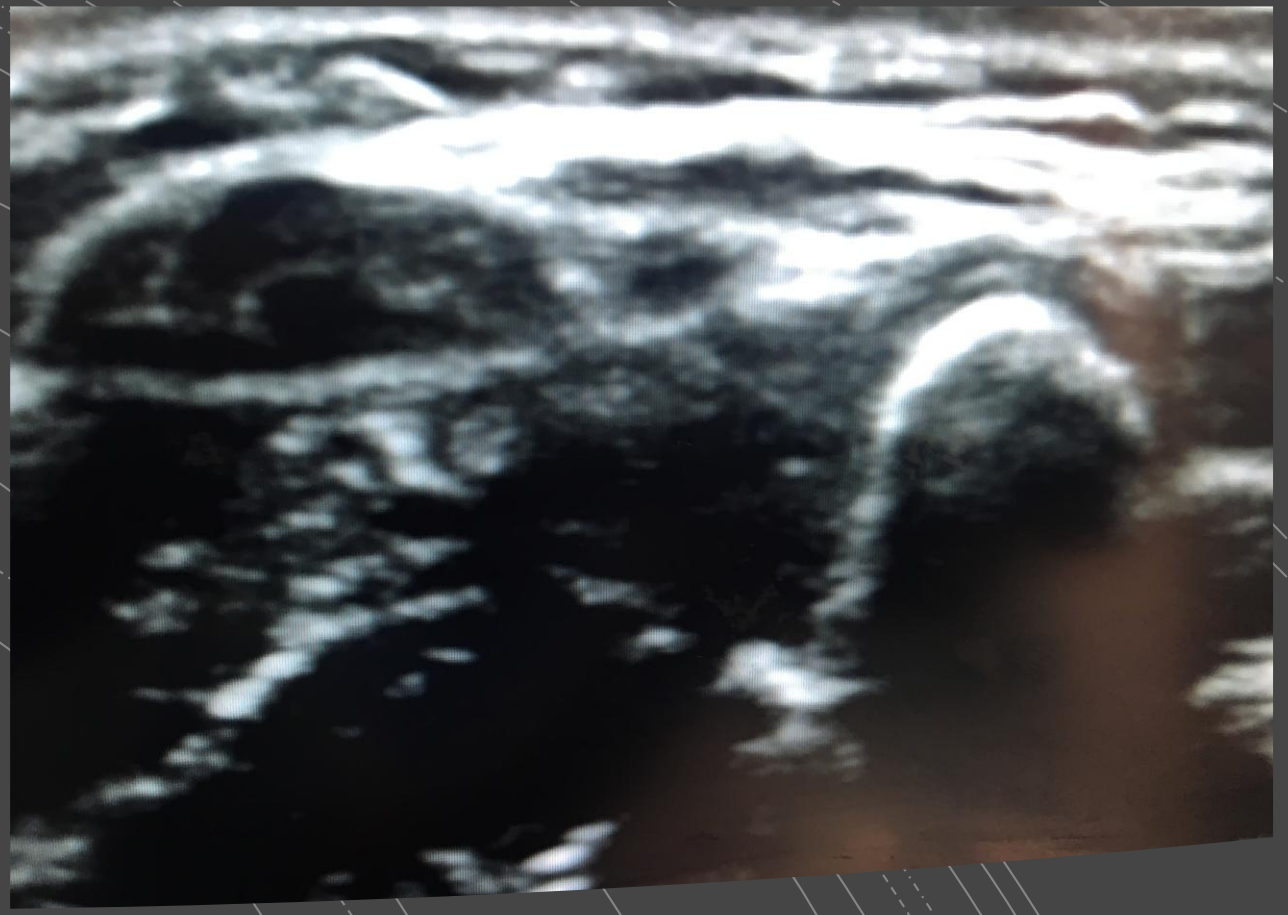
- <u>Kanylácia “naslepo” (Landmarks + palpácia pulzu)</u>
  - 70% úspešnosť u dospelých
  - “neštandardný” pacient, hypotenzia
  - Komplikácie: hematóm, spazmus, poškodenie intimy cievy
  - Distálne zápästie
  - Obtiažná fixácia
  - Vyššie riziko infekcie
  - Polohová deformácia krivky
  - Bolestivosť pri pohybe ruky

Kanylácia “naslepo” u detí



Zone insertion method

- Arterial insertion method
- European Society of Anaesthesiology guidelines 2018
- Identifikácia “ideálneho” miesta inzercie arteriálneho katétra
- Ultrazvuková navigácia – out of plane
- Kvalitnejšia fixácia, komfort
- Nižšie riziko infencie



USG navigícia – out of plane

- Vyššia úspešnosť kynalácie aj v prípade ”neštandardného” pacienta
- USG kontrola polohy vodiča intraarteriálne
- Použite ZIM, proximálnejšia časť predlaktia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Manual
Delete


SonoSite
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Page 1/2

Na predstavu o veľkosti

COLOR CODE	Gauge & Length	Catheter		Flow Rate
		O.D	Length (mm)	(ml/mm)
ORANGE	14G*1"3/4	2.10	45	270
GREY	16G*1"3/4	1.70	45	180
WHITE	17G*1"3/4	1.50	45	125
GREEN	18G*1"3/4	1.30	45	80
PINK	20G*1"3/4	1.10	32	54
BLUE	22G*1"	0.90	25	33
YELLOW	24G*3/4	0.70	19	20
VIOLET	26G*3/4	0.60	16	19

Original research article

JVA The Journal of Vascular Access

Arterial insertion method: A new method for systematic evaluation of ultrasound-guided radial arterial catheterization

The Journal of Vascular Access
1–6

DOI: 10.1177/1129729820944104
journals.sagepub.com/home/jva
SAGE

Amy JBardin-Spencer[1] and Timothy R Spencer[2]

Abstract

Introduction: Peripheral arterial catheter insertion is a common procedure for critically ill patients requiring frequent blood gas sampling and continuous blood pressure monitoring. There are clear advantages of ultrasound-guided arterial cannulation, which have shown to be more effective in reducing complications, time to successful cannulation, number of attempts, and overall first-time success rates. Evidence suggests that using palpation alone has a first-time success rate of less than 70% yet is still a widely performed technique. A systematic evaluation may be required to reduce variations in arterial catheterization practices.

Design: The arterial insertion method is a systematic evaluation to aid in arterial catheter insertion with ultrasound guidance, intended to improve the procedural approach. The process of arterial insertion method ensures appropriate choice of zone selection to optimize catheter longevity and performance in patients requiring arterial access. Moving the insertion site proximally 4 cm from the red zone into the green zone may reduce mechanical complications and preserve catheter performance and dwell time.

Conclusion: The standardization of ultrasound guidance in arterial catheterization promotes vessel health and patient safety through device and site optimization. The arterial insertion method systematic evaluation may be utilized to reduce variation in practice and promote the use of ultrasound as a standard for the insertion of radial arterial catheters.

Pediatric Anesthesia

RESEARCH REPORT

The ulnar artery: A site suitable for arterial cannulation in pediatric patients

Conclusions

The ulnar artery was larger than the radial artery in 60% of pediatric patients thus may offer an arterial cannulation site advantage due to its larger size. The use of 2-dimensional ultrasound examination allows accurate assessment of upper extremity distal arteries in order to optimize site selection for arterial cannulation in pediatric patients.

less easily palpated than the radial artery. With the current routine use of ultrasound in pediatric patients, the ulnar is as accessible as the radial and could be viewed as an equivalent site for cannulation.

› Anesth Analg. 2025 Apr 1;140(4):957-965. doi: 10.1213/ANE.0000000000006972. Epub 2024 Jun 27.

Central Arterial Line Placement for Pediatric Cardiac Surgery: A Single-Center Experience

Katherine L Zaleski [1], Michael T Kuntz [2], Steven J Staffa [1], Hannah Van Pelt [1], A Rebecca L Hamilton [3 4], Douglas B Atkinson [1]

Conclusions: Axillary arterial access is associated with a lower rate of complications in pediatric patients undergoing cardiac surgery as compared to femoral arterial access. Serious complications are rare and were limited to femoral arterial lines in this study.

not feasible. At present, there are limited data to guide central arterial-line site selection in pediatric patients. We aimed to (1) quantify the rate of complications associated with central arterial-line placement in pediatric patients undergoing cardiac surgery, (2) determine risk factors associated with central arterial-line complications, and (3) describe placement trends during the last decade.

Fixácia + starostlivosť

Šitie ?

- Bolestivosť, krvácanie, traumatizácia, riziko infekcie

Lepenie tkanivovým lepidlom

Najnovšie fixačné materiály a lepenia

- Prehľadné miesto vpichu
- Menšia traumatizácia, bolestivosť
- Lepšia fixácia

Kontinuálny preplach linky

- Heparín
- 0,9%NaCl
- Pentoxyfyllin



- Lepenie miesta inzercie tkanivovým lepidlom znižuje riziko prieniku baktérii do krvného obehu a zároveň riziko kolonizácie katétra
- Arteriálny GripLock udržuje arteriálny katéter v ideálnej pozícii a umožňuje voľný pohyb končatinou

Komplikácie

▸ J Pediatr Intensive Care. 2022 Jan 27;13(4):315–320. doi: 10.1055/s-0041-1742254

Management of Neonatal Limb Ischemia Secondary to Peripheral Arterial Lines: A Systematic Review

Samantha Louise Slee [1,✉], Yangmyung Ma [2]

OPEN ACCESS

Management of iatrogenic acute limb ischaemia in the neonate

Dotan Shaniv [1,2], Yael Simpson-Lavy,[1] Calanit Hershkovich Shporen[1,3]

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SUMMARY

Iatrogenic acute limb ischaemia (ALI) in neonates is a rare but severe event with potentially deleterious outcomes. In the neonatal intensive care unit, this risk is increased due to the high rate of catheterisation procedures. ALI management includes pharmacological and non-pharmacological interventions, but no commonly accepted clinical guidelines are available. In the present case, a peripheral catheter was erroneously placed in the left brachial artery of a term infant, causing blockage and ischaemia in the limb. The catheter was immediately removed, the affected limb was elevated and warm compresses were applied to the contralateral limb. The patient was treated with fresh frozen plasma, and was admitted to the NICU. He was early on suspected to have Trisomy 21 (Down syndrome), which was later confirmed by genetic testing. During the first hour of life, a peripheral catheter was placed for intravenous nutritional support and antibiotic treatment. At 13 hours of age, the left hand and forearm were observed to be pale and cold to the touch. A left brachial artery blockage was suspected and the catheter was immediately removed. No pulse was palpated at the radial artery or detected via an upper limb arterial duplex (Doppler) scan at ~20 hours of age, which demonstrated normal, unobstructed veins and brachial artery up to the middle third of the forearm.

OPEN ACCESS

Management of iatrogenic acute limb ischaemia in the neonate

Dotan Shaniv ,[1,2] Yael Simpson-Lavy,[1] Calanit Hershkovich Shporen[1,3]

Table 1 Summary of pharmacological treatments

Drug name (generic name)	Route of administration	Dosage	Chronology of treatment (total duration)*	Monitoring parameters
Heparin	Intravenous	30–38 IU/kg/hour	Days 1–6 (5 days)	aPTT
Nitroderm (nitroglycerin)	Transdermal	~4 mg/24 hours (patch on: 20 hours, patch off: 4 hours)	Days 1–13 (12 days)	Methaemoglobin levels, blood pressure
Ilomedin (iloprost)	Intravenous	2–12 ng/kg/min	Days 1–6 (5 days)	Blood pressure
Nerve block with ropivacaine 0.1%	Perineural injection	3 mg	Days 2–4 (once daily)	N/A
Clexane (enoxaparin)	Subcutaneous	Therapeutic: 1.5–2.1 mg/kg×2/day	Days 6–17 and beyond discharge (16 days)	Anti-Xa
		Prophylactic: 2 mg/kg×1/day	21 days (postdischarge)	

*Day count starts from 0 as the day of birth.
aPTT, activated partial thromboplastin time; IU, international units; N/A, not applicable.

▸ Case Rep Pediatr. 2013 Oct 23;2013:608516. doi: 10.1155/2013/608516

Topical Nitroglycerine for Neonatal Arterial Associated Peripheral Ischemia following Cannulation: A Case Report and Comprehensive Literature Review

Rafat Mosalli [1,2], Moha

Abstract

Arterial cannulati blood pressure monitoring and b ted by skilled neonatal staff, can be assoc asm, thrombosis, embolism, hemat ia, and tissue necrosis. Several treatment d ischemia and tissue damage. Applied i lvement and whether the condition is progr oninvasive measures include immediat the contralateral extremity. Topical l surgery are considered secondary therap ch indicates that topical nitroglycerin has a in three preterms with umbilical arterial We report the first successful use of nitroglycerine ointment in a critically ill preterm infant with ischemic hand changes after brachial artery cannulation.

Keď sa darí

(periférna blokáda n. ischiadicus u 1,5kg dieťaťa)

My s krémom, a vy?