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SCIENTIFIC LETTER

Paediatric post-traumatic pseudoaneurysm: Our experience☆

Pseudoaneurismas postraumáticos pediátricos: nuestra experiencia

Dear Editor

Invasive procedures performed in children, especially in the first year of life, carry a risk of significant vascular injury.[1] Numerous cases of pseudoaneurysm secondary to vascular catheterization have been described in the paediatric population.[1–4] The mechanism of injury seems to be associated with the small size of the vessels and the movements performed in catheterization attempts, which may tear vessel walls. Failure to apply local compression after catheter insertion is also considered one of the frequent mechanisms of injury.[1] Multiple therapeutic options have been suggested to treat post-traumatic pseudoaneurysms in paediatric patients, including ultrasound-guided compression, intralesional thrombin injection,[5] endovascular treatment[3] and surgical repair.[1,2,4]

The clinical history of all patients diagnosed and treated for posttraumatic pseudoaneurysm in our center between 2008 and 2021 was reviewed. (Table 1). We contacted the parents of the patients to collect information on their current quality of life, the need of follow-up and the presence of complications.

Between 2008 and 2021, 6 patients received a diagnosis of post-traumatic pseudoaneurysm. Two were preterm infants who needed multiple vascular access lines during their prolonged stay in the neonatal unit. Five were aged less than 1 year at the time of diagnosis of the pseudoaneurysm, and 1 patient was aged 12 years. All patients had a history of traumatic vascular access prior to diagnosis of the pseudoaneurysm. Five had arterial pseudoaneurysms (3 in the left brachial artery and 2 in the right brachial artery), while 1 presented with pseudoaneurysm in the left cephalic vein.

The diagnosis was made by physical examination and Doppler ultrasound (3 patients), computed tomography angiography (CTA, 2 patients) and magnetic resonance angiography (MRA 1 patient) (Fig. 1). One of the patients had filiform stenosis of the brachial artery distal to the pseudoaneurysm. In the remaining 5 patients, the calibre of the vessel distal to the pseudoaneurysm was normal.

One of the patients received mechanical compression and 1 an ultrasound-guided intralesional injection of thrombin before being referred to our hospital. One patient had mild anaemia (haemoglobin [Hb], 9.8 g/dL) at the time of diagnosis.

Five patients underwent surgical repair of the pseudoaneurysm. The selected surgical approach was the opening of the pseudoaneurysm under temporary interruption of local circulation followed by endoaneurysmorrhaphy with a discontinuous monofilament suture. None of the patients required a bypass, nor was there significant vasospasm requiring pharmacological therapy. The mean length of stay was 1.33 ± 1.03 days. None of the patients developed postoperative complications.

The remaining patient was managed with watchful waiting due to the long time elapsed from the formation of the pseudoaneurysm (12 months) and its stable size from the time of diagnosis.

In 2021 we contacted the parents of the patients and confirmed that the patients were asymptomatic and did not have any sequelae. In all patients, the cosmetic outcomes of the surgical scar were good. The mean duration of follow-up was 88.8 ± 53 months. Only the patient managed conservatively continued to require follow-up every 2 years, but the size of his pseudoaneurysm has remained stable to date.

Paediatric post-traumatic pseudoaneurysms are rare but potentially serious lesions. Although they are more frequent in children under 1 year, especially in neonates, post-traumatic pseudoaneurysms can also occur in older patients, as was the case of 1 of the patients in this case series.

Pseudoaneurysm should be suspected in the presence of a progressively growing pulsatile mass following manipulation of a vascular access line, and external compression should be initiated as soon as possible. The diagnosis is confirmed by imaging, and Doppler ultrasound is considered the gold standard. The yin–yang sign is commonly observed in the Doppler ultrasound scan, but its specificity is only moderate.[6] Doppler flow imaging showing antegrade flow during systole and retrograde flow during diastole allows diagnosis of arterial pseudoaneurysm (but not venous pseudoaneurysm).

The use of other diagnostic techniques should be adapted to each individual clinical scenario (for instance, if a paediatrics or anaesthesia team capable of performing sedation is available to perform a MRA, or axial multiphase CTA delayed phase imaging is chosen, taking into account the significant exposure to radiation that it entails).

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Table 1 Clinical characteristics of the patients included in the case series.

Patient no.	Age at diagnosis	Sex	Pseudoaneurysm location	Pseudoaneurysm size (mm)	Distal vascular calibre	Initial treatment	Definitive treatment	Time from diagnosis to definitive treatment	Clinical course	Mean duration of follow-up (months)
1	3 months	Female	Left brachial artery	27 (AP)	Normal	None	Surgical repair	24 days	Uneventful	148
2	14 months	Female	Left brachial artery	20 × 20	Normal	Local compression	Surgical repair	27 days	Uneventful	118
3	4 months	Male	Right brachial artery	3.6 × 4 × 7	Normal	None	–	–	Uneventful, biannual clinical reviews	123
4	3 months	Male	Left brachial artery	23 × 20	Normal	None	Surgical repair	23 days	Uneventful	110
5	13 years	Male	Left cephalic vein	34 × 27 × 20	Normal	None	Surgical repair	13 months	Uneventful	34
6	1 month	Male	Right brachial artery	19 × 13 × 23	Decreased calibre	Intralesional ultrasound-guided thrombin injection	Surgical repair	5 days	Uneventful	0

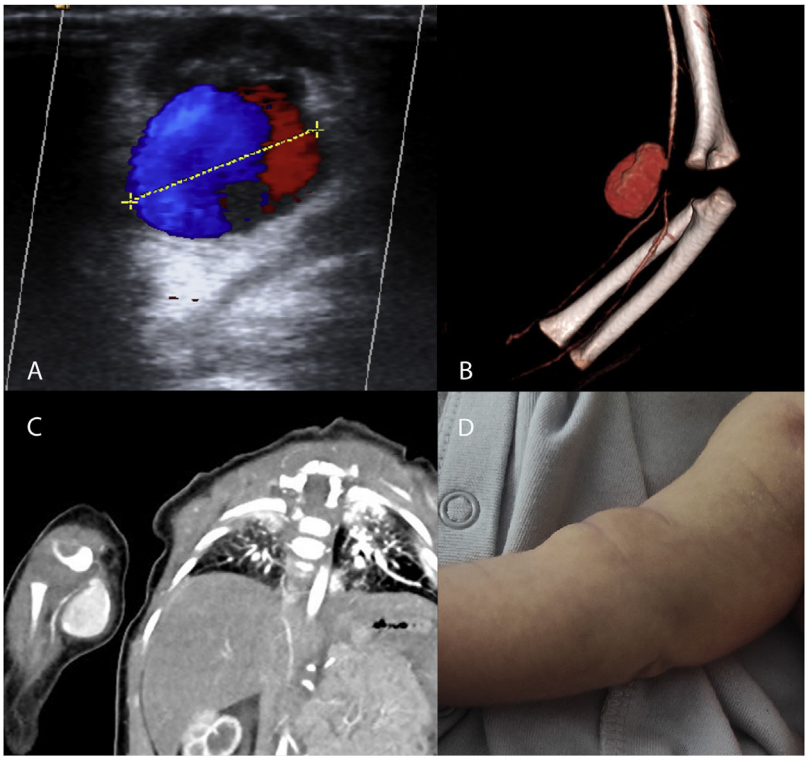

Figure 1 (**A–C**) Imaging studies of patients with pseudoaneurysms. (**A**) Doppler ultrasound. Yin–yang sign attributed to turbulent flow inside the arterial pseudoaneurysm. (**B**, **C**) CTA and 3D reconstruction of pseudoaneurysm dependent on the right brachial artery, with distal narrowing of vessel calibre. (**D**) Photograph of the patient with a pseudoaneurysm in the right brachial artery. Mass in right forearm 48 h after the traumatic puncture.

In recent years, new therapeutic options have emerged, such as ultrasound-guided intralesional thrombin injection or endovascular treatment. However, the clinical experience with these modalities in paediatric patients is scarce and should be interpreted with caution given the absence of specific studies supporting their use.

We ought to note that intralesional thrombin injection requires a prior echocardiogram to exclude the presence of an atrial septal defect or patent foramen ovale, in case of possible migration of the injected material (a rare complication, but one that may occur in the case of atrial septal defect). This is especially relevant when the pseudoaneurysm involves the venous territory.

Withholding treatment with close monitoring is a reasonable approach to management in patients with long-standing post-traumatic pseudoaneurysms that have been stable over time, although the experience with this type of case is limited in our hospital.

Although there are no clinical guidelines for the management of post-traumatic pseudoaneurysms in the paediatric population, it is assumed that the risk factors for rupture are similar to those in adult cases of pseudoaneurysm (maximum diameter, morphology, etc.). In our experience, the initial management should be surgical, unless, as happened in one of our patients, there is evidence of long-standing aneurysmal stability, in which case conservative management may be a reasonable option.

Nevertheless, in our experience, surgery performed by an experienced specialist is a curative treatment with optimal short- and long-term results.

One of the main barriers is the lack of surgical training on a highly infrequent and technically complex pathology. Some feasible options to facilitate such training would be experimental microsurgery courses,

specific rotations in vascular surgery departments or the use of artificial vascular simulators (with 3D printing, silicone prostheses, etc.). When it comes to the prevention of post-traumatic pseudoaneurysms, clinicians who treat children, especially infants under 1 year of age, should receive specific training on vascular access management to reduce the risk of iatrogenic lesions.

References

1. López-Gutiérrez JC, Encinas JL, Luis A, Ros Z, Díaz M. Traumatismos arteriales en el primer año de vida. An Pediatr. 2003;59:290–3, http://dx.doi.org/10.1016/s1695-4033(03)78180-6.
2. Gow KW, Mykytenko J, Patrick EL, Dodson TF. Brachial artery pseudoaneurysm in a 6-week-old infant. Am Surg. 2004;70:518–21. PMID: 15212406.
3. Pelchovitz DJ, Cahill AM, Baskin KM, Kaye RD, Towbin RB. Pseudoaneurysm in children: diagnosis and interventional management. Pediatr Radiol. 2005;35:434–9, http://dx.doi.org/10.1007/s00247-004-1320-7.
4. Lin PH, Dodson TF, Bush RL, Weiss VJ, Conklin BS, Chen C, et al. Surgical intervention for complications caused by femoral artery catheterization in pediatric patients. J Vasc Surg. 2001;34:1071–8, http://dx.doi.org/10.1067/mva.2001.119043.
5. Hussain Q, Maleux G, Heye S, Gewillig M, Mertens L. Post-catheterization pseudoaneurysm in a one-year-old child treated

by ultrasound-guided human thrombin injection. JBR-BTR. 2009;92:76–7. PMID: 19534238.
6. Lupattelli T. The yin-yang sign. Radiology. 2006;238:1070–1, http://dx.doi.org/10.1148/radiol.2383031884. PMID: 16505401.

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COVID-19 infection in childbirth and exclusive breastfeeding rates in a BFHI maternity☆

Infección por COVID-19 en el parto y tasas de lactancia materna exclusiva en una maternidad IHAN

Dear Editor:

Early in the coronavirus disease 2019 (COVID-19) pandemic, it was recommended that rooming-in and breastfeeding (BF)[1] be avoided in mothers infected by SARS-CoV-2. Although later guidelines recommended maintaining early mother-infant contact and BF promotion (World Health Organization and Sociedad Española de Neonatología [SENeo]),[2] in many instances, the pressure on the health care system and the reorganization of care delivery hindered adherence to these recommendations.[3]

The primary objective of our study was to assess whether the exclusive BF rate during the stay in the maternity ward and at discharge were affected by the detection of SARS-CoV-2 infection in the mother at the time of delivery in tertiary hospitals accredited by the baby-friendly hospital initiative (BFHI/IHAN). The secondary objective was to assess changes in exclusive BF rates through the first 3 waves of the pandemic in neonates born to mothers with SARS-CoV-2 infection.

We conducted a retrospective cohort study in a BFHI-accredited tertiary care hospital. The sample included mothers with a diagnosis by polymerase chain reaction (PCR) of infection by SARS-CoV-2 at the time of delivery (n = 58) who did not meet the exclusion criteria: admission to the intensive care unit (ICU), admission of newborn to neonatal ward for reasons unrelated to care organization, preterm birth or multiple pregnancy. The study also included a control group of mothers without SARS-CoV-2 infection (n = 116) who gave birth before and after each included mother, applying the same exclusion criteria. The study period included the first 3 waves of the pandemic.[4] The sample included 84 patients in the first wave (28 with COVID-19 and 56 controls), 69 patients in the second wave (23 with COVID-19 and 46 controls) and 21 patients in the third wave (7 with COVID-19 and 14 controls). The study was approved by the research ethics committee.

We performed a descriptive analysis summarising categorical variables as absolute and relative frequencies and quantitative values as mean and standard deviation or median and interquartile range. In the univariate analysis, we used the Mann-Whitney *U* test or the Student *t* test to compare quantitative data and the chi square or Fisher exact test for hypothesis testing with categorical data. We set the level of significance at 0.05.

Table 1 presents the demographic characteristics of the 2 groups. We did not find differences in any variable other than the duration of BF in mothers that had previous children.

The rate of exclusive BF in the maternity ward in infants born to mothers with a diagnosis of SARS-CoV-2 infection at the time of delivery was 72.4%, compared to 88.8% in the control group (OR, 0.33; 95% confidence interval [CI], 0.14—0.74; *P* = .004). At the time of discharge, the rate of exclusive BF in the group with SARS-CoV-2 infection was 70.7% compared to 86.2% in the control group (OR, 0.38; 95% CI, 0.17—0.83; *P* = .01).

When we compared exclusive BF rates in the first wave versus subsequent waves, we did not find differences in the rate during the hospital stay in the first wave versus the second and third waves (73.3% vs 71.4%; *P* = .87). There were also no differences in the exclusive BF rate at discharge (70% in first wave vs 71.4% in subsequent waves; *P* = .9).

In our study, we found that the rate of exclusive BF, both during the hospital stay and at discharge, was lower

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