

Background

- Previous studies have reported improvement in migraine symptoms after percutaneous patent foramen ovale(PFO) closure in adults.
- The benefit of PFO closure in children with migraine remains unclear.
- The aim of the study was to evaluate the short- and intermediate-term effect of percutaneous PFO closure on migraine in children.

Methods

- The study retrospectively analyzed data from pediatric patients diagnosed with migraine who underwent percutaneous PFO closure at Guangdong Provincial People's Hospital from January 2019 to June 2023.
- The patients were followed up at 1, 3, 6, 12 month and annually after 1 year.
- The information was collected from the electronic medical record system of the hospital and telephone call follow-ups.

Results

- A total of 41 children (24 males) with migraine who underwent percutaneous PFO closure were included.
- During a median follow-up of 0.67 years (range 0.25-3.4 years):
- ✓ 24(58.5%) patients had complete resolution of symptoms.
- ✓ 10(24.4%) patients had significant improvement of symptoms.

- ✓ 7(17.1%) patients reported no relief of symptoms.
- ✓ Overall, 82.9%(34/41) of pediatric patients experienced abolished or significant reduction of migraine attacks after percutaneous PFO closure.
- During follow-up, residual shunt was presented in 4 (9.7%) patients, and no major complications occurred.

Table 1. Patient demographics

No. of patients who underwent implantation	N=41
Sex	
Male	24(58.5%)
Female	17(41.5%)
Patient age, yrs	
Median	12.2
Range(min, max)	5.7-17.6
Weight, Kg	
Median	44.2
Range(min, max)	21.5-77.0
PFO size, mm	
Mean(SD)	2.5(1.0)
Median	2.2
Range(min, max)	1.1-4.9
Indication for PFO closure	
Migraine with aura	7(17.1%)
Migraine without aura	34(82.9%)
Contrast TTE	
Severe RLS	34(82.9%)
Moderate RLS	7(17.1%)
PFO with high-risk anatomic characteristics	
Large-size PFO(≥2mm)	19(46.3%)
Atrial septal aneurysm	2(4.9%)
Long tunnel	1(2.4%)

Results

Table 2. Clinical features of pediatric migraine improvement after PFO closure

	Improvement of migraine symptoms (n=34)	No improvement of migraine symptoms (n=7)	P value
Age,yrs	12.4±3.1	12.0±2.2	0.701
Male	21(61.8%)	3(42.8%)	0.421
Weight(Kg)	44.4±16.0	41.6±16.3	0.668
High-risk PFO	21(61.8%)	1(14.3%)	0.036*
PFO size (mm)	2.5±1.0	2.1±0.5	0.097
Large RLS at rest	10(29.4%)	2(28.6%)	1.000
Large RLS at Valsalva	30(73.2%)	4(57.1%)	0.082
Migraine with aura	5(14.7%)	2(28.6%)	0.581
Residual shunt at follow-up	2(5.9%)	2(28.6%)	0.128

Table 3. Clinical features of pediatric migraine patients with/without high risk PFOs

	Patients with high risk PFOs (n=22)	Patients without high risk PFOs (n=19)	Pvalue
Age,yrs	11.5±3.0	13.4±2.5	0.034*
Male	14(63.6%)	9(47.4%)	0.337
Weight(Kg)	41.0±16.1	47.4±15.4	0.199
PFO size (mm)	3.12±0.85	1.71±0.39	<0.001*
Large RLS at rest	7(31.8%)	5(26.3%)	0.744
Large RLS at Valsalva	19(90.5%)	15(78.9%)	0.685
Migraine without aura	1(4.5%)	6(31.6%)	0.036*
Residual shunt at follow-up	2(9.1%)	2(10.5%)	1.000
Improvement of migraine symptoms	21(95.5%)	13(68.4%)	0.036*

Conclusions

- A majority of pediatric patients with migraine experienced either a complete resolution or significant improvement of symptoms after percutaneous PFO closure.
- High-risk PFO was associated with migraine relief or improvement after PFO closure in children.
- Percutaneous PFO closure might be a safe and effective solution to reduce migraine symptoms in a selected subset of pediatric patients.