PHACES Syndrome with Intestinal Hemangioma Causing Recurrent Intussusceptions: A Case Report and Literature Review of Associated Intestinal Hemangioma

Buthaina Al-Musalhi[1]* and Zainab Al-Balushi[2]

[1]Pediatric Dermatology Unit, Sultan Qaboos University Hospital, Muscat, Oman
[2]Surgery Department, Sultan Qaboos University Hospital, Muscat, Oman

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ABSTRACT

PHACES syndrome comprises *p*osterior fossa malformations, segmental *h*emangioma, *a*rterial anomalies, *c*ardiac defects, *e*ye anomalies and less commonly, *s*ternal cleft, or supraumbilical raphe. We report a case of PHACES syndrome associated with intestinal hemangioma causing recurrent intussusceptions. A full-term infant female presented at the age of three months with segmental distribution of telangiectatic patch with red swelling involving the right periorbital area, right forehead, and lips. After a full workup and evaluation, the diagnosis of PHACES syndrome was confirmed based on the presence of facial segmental hemangioma, hypoplastic right internal carotid artery, intracranial hemangioma, and right optic disc anomaly. At the time of workup, she developed typical symptoms of intussusception. Diagnostic laparoscopy was performed, and she was found to have hemangioma covering the whole ileal wall and a thickened circumferential hemangioma covering the mid ilium causing the lead point of the intussusception. Control of this patient's hemangiomas was achieved by surgical resection of the thickened circumferential hemangioma covering the mid ilium along with oral propranolol. We reviewed the literature to explore the relationship between gastrointestinal (GI) hemangioma and PHACES syndrome and compared other associated extracutaneous hemangioma of the same series. We found 18 (58%) reported cases of GI hemangioma compared to other visceral hemangiomas on the same series of confirmed PHACE syndrome. All of the reported cases in this series present with anemia and GI bleeding except our patient who had intussusception. This might indicate the significant association of GI hemangioma as extracutaneous hemangioma in PHACES syndrome, emphasizing the importance of investigating symptomatic patients.

PHACES syndrome is considered a common neurocutaneous vascular disorder, and presents with a spectrum of anomalies involving different organ systems.[1] It comprises *p*osterior fossa malformations, segmental *h*emangioma, *a*rterial anomalies, *c*ardiac defects, *e*ye anomalies, *s*ternal cleft, or supraumbilical raphe. In 2009 a consensus diagnostic criteria for PHACES syndrome was published.[2] The consensus classifies patients into PHACES or possible PHACES syndrome, based on a list of major and minor criteria used to define whether the patients qualify in the cerebrovascular, structural brain, cardiovascular, ocular, and/or ventral midline categories.[2] The associated visceral hemangioma with PHACES syndrome is not considered part of the diagnostic criteria.

This report describes a unique presentation of intussusception caused by gastrointestinal (GI) hemangioma in a patient with PHACES syndrome along with a literature review looking for the association of GI hemangioma and PHACES syndrome, its common clinical manifestation, and to compare GI hemangioma with other associated visceral hemangiomas in the same series.

CASE REPORT

A full-term infant girl noted at two-weeks-old with faint segmental distribution of telangiectatic patch

*Corresponding author: ✉dr-almuslahi@hotmail.com

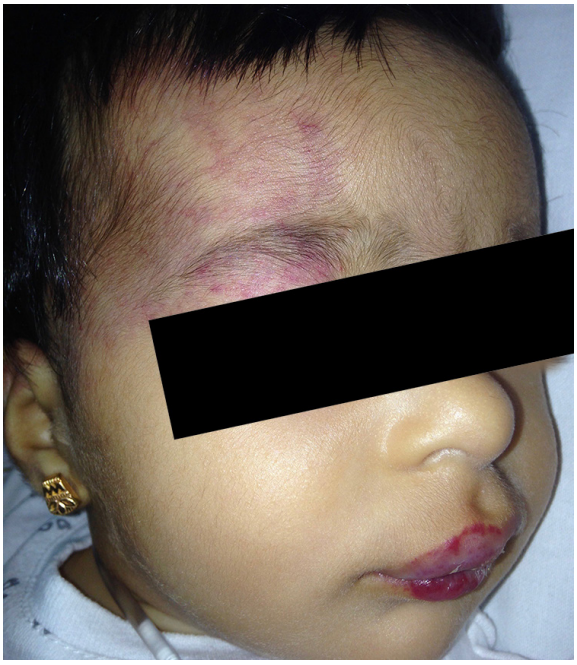

Figure 1: At presentation showing segmental telangiectatic patch with red swelling involving the right periorbital area and right forehead in addition to lips involvement.

involving the right periorbital area, right forehead, and lips [Figure 1]. At the age of three-months, she presented to the hemangioma clinic Sultan Qaboos University Hospital in Muscat, Oman, with these lesions which had progressed to more intense redness and swelling.

Due to the segmental distribution of the hemangioma over the face, PHACES syndrome was suspected. A thorough workup and evaluation, including magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), cardiology, and ophthalmology assessments were performed.

After complete workup and evaluation, the diagnosis of PHACES syndrome was confirmed based on facial segmental hemangioma, hypoplastic right internal carotid artery [Figure 2], and right optic disc anomaly. She was also found to have intracranial hemangioma. During workup, she developed projectile vomiting, abdominal pain, and redcurrant jelly stool. Ultrasound was done and showed intussusception.

Pneumatic reduction under fluoroscopy guidance was attempted three times; however, recurrence of the intussusception occurred within hours after each trial. Further evaluation by computed tomography (CT) of the chest, abdomen, and pelvis was done [Figure 3]. Diagnostic laparoscopy revealed hemangioma covering the whole ileal wall and a thickened circumferential hemangioma covering the mid ilium was identified as the lead point of the intussusception. Laparotomy was done, and mid ilium resection of the circumferential hemangioma [Figure 4] and end-to-end anastomosis was performed. The postoperative course was uneventful. Histopathology confirmed diffuse infantile hemangioma in the resected part.

In this patient, starting propranolol was debatable given the risk of developing a stroke due to the intracranial arterial anomaly. However, considering the possible devastating consequences of proliferating hemangioma situated in critical

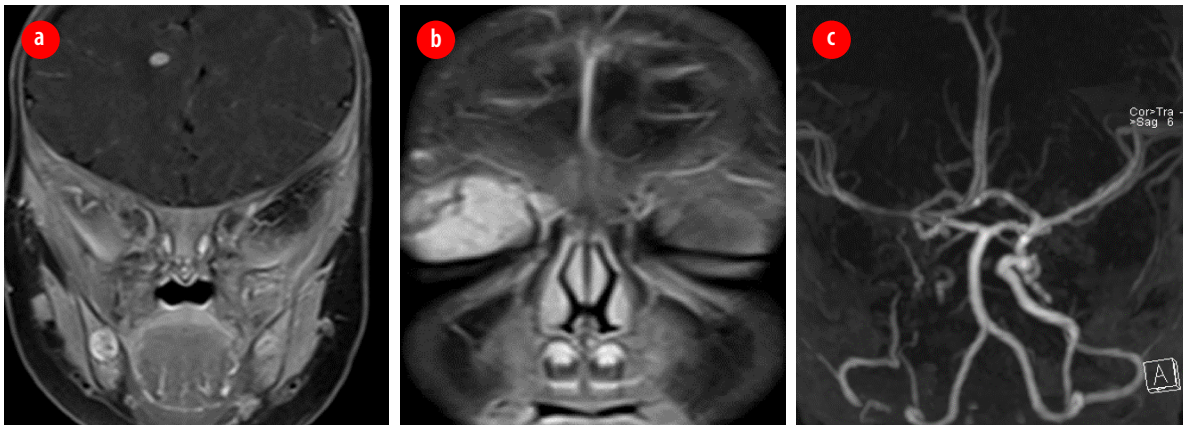

Figure 2: Brain magnetic resonance imaging and magnetic resonance angiography. **(a)** Mixed-signal intensity lesion in the right frontal region subcortical with features suggesting intracranial hemangioma. **(b)** Intensely enhancing vascular hemangioma seen in the right preseptal region/lid extending posteriorly to the superior extra conal space. **(c)** Hypoplastic right internal carotid artery in its entire length to the supra-clinoid region.

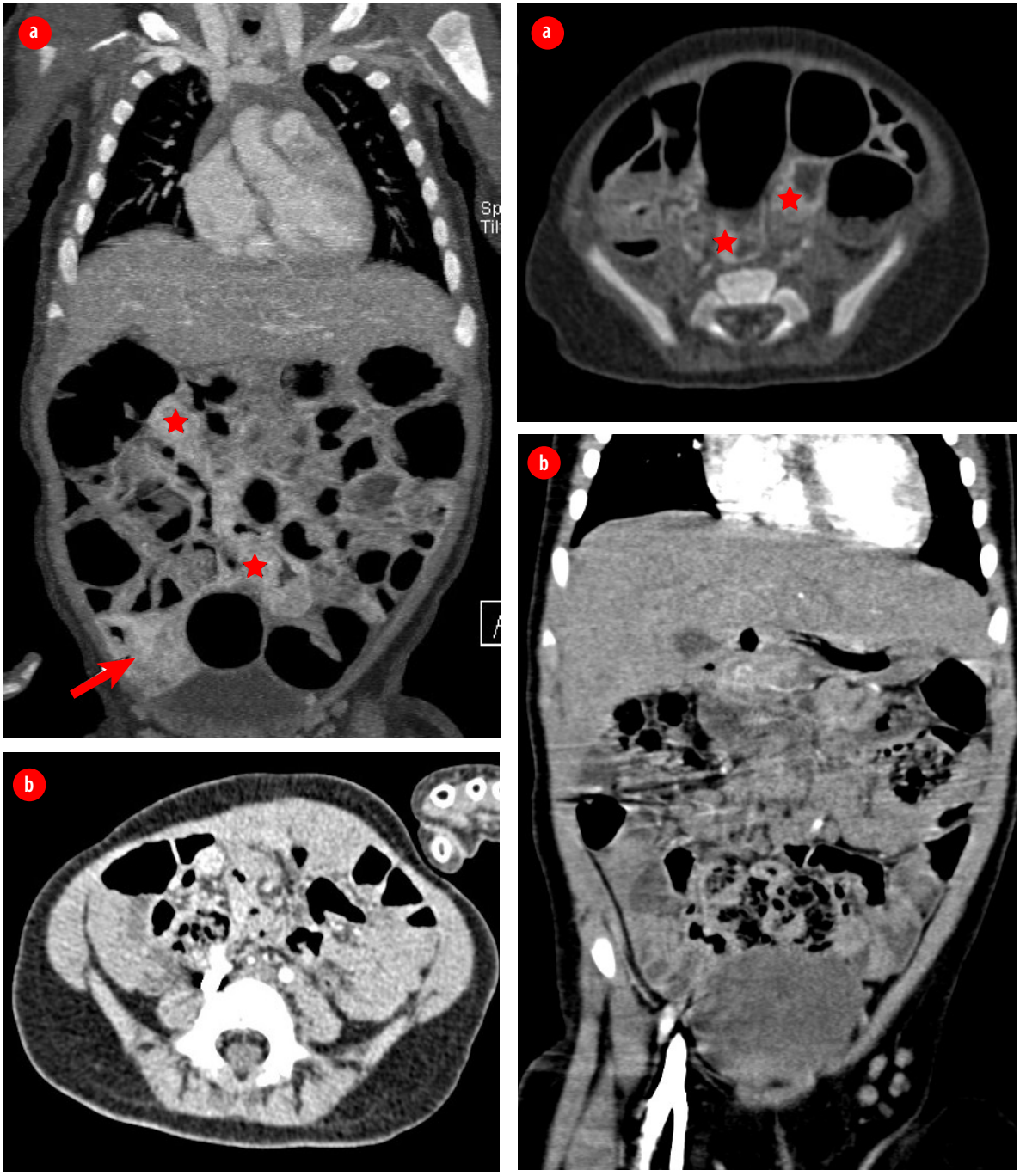

Figure 3: Computed tomography of the chest, abdomen, and pelvis with intravenous contrast in coronal and axial portal venous phase. **(a)** Nodular enhancement seen in the wall of different parts of the small bowel (stars) and large bowel seen at the cecum (arrow). **(b)** Interval reduction in the previously seen wall nodular enhancement in the small and large bowel loops after four months of treatment with propranolol.

locations like the periorbital, intestinal, and intracranial area; hence propranolol was started at a low dose (1.5 mg/kg/day) with careful monitoring. Control of this patient's hemangiomas was ultimately achieved with propranolol 1.5 mg/kg/day and the response was evaluated by CT abdomen [Figure 3]. Propranolol was tapered off and stopped at the age of 24 months.

DISCUSSION

We conducted a literature review to explore the relationship between GI hemangioma and PHACES syndrome [Table 1]. It is well described that segmental cutaneous infantile hemangioma can be associated with severe lower GI bleeding caused by infantile hemangioma involving a discrete segment of the GI tract.[3] Visceral hemangioma is generally

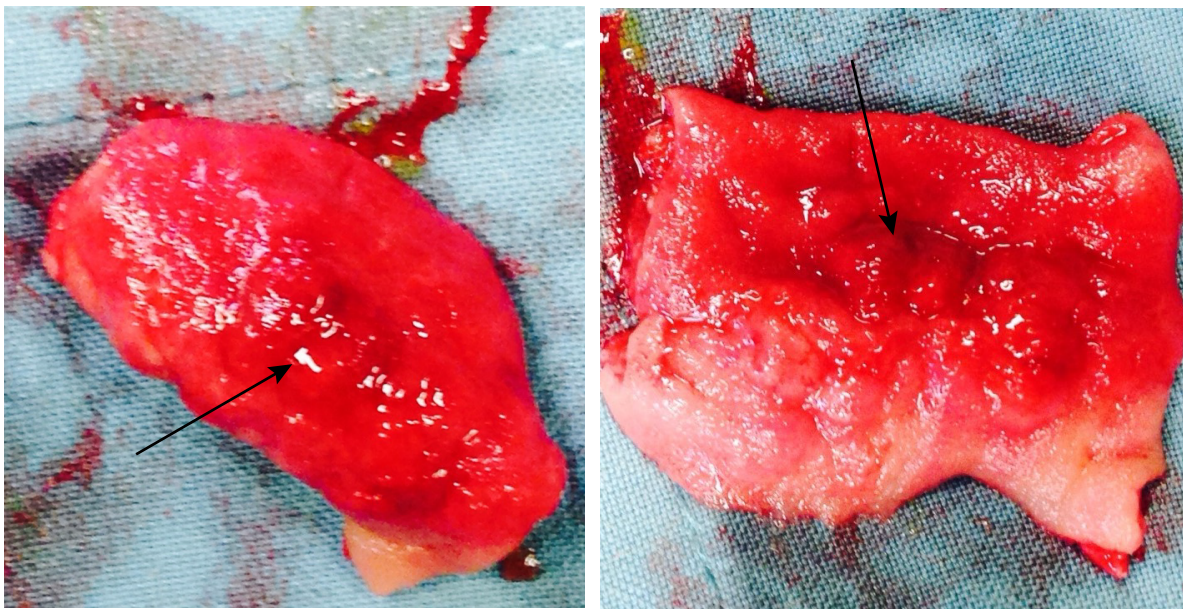

Figure 4: Intestinal hemangioma. Resected part of mid ilium showing thickened circumferential hemangioma (black arrow).

Table 1: The numbers and the anatomical sites of visceral hemangiomas in case series of patients with PHACES syndrome.

Author	Anatomical site	Reported visceral hemangioma, n
Drolet et al,[3] summary of findings in nine patients with confirmed PHACES syndrome	Liver	3
	Spleen	1
	GI tract	9
	Pancreas	2
	Paraspinal	1
	Orbital	1
	Subglottic	2
Soukoulis et al,[4] one patient with confirmed PHACES syndrome	Neck and thorax	3
	Retroperitoneal	1
	GI tract	1
Pascual-Castroviejo et al,[5] one PHACES case	GI tract	1
Metry et al,[1] summary of findings in 19 patients with confirmed PHACES syndrome	Brain	10
	Mediastinum	9
	GI tract	6
	Liver	5
	Lung	3
	Pancreas	1
	Bone	1
This study confirmed PHACES	Brain	1
	GI tract	1

Table 2: The total number and percentage of reported visceral hemangiomas classified according to the anatomical site (based on data from Table 1, n = 31).

Anatomical site	Total number of reported visceral hemangiomas, n	Percentage, %
Gastrointestinal tract	18	58
Mediastinum + neck and thorax + lung	15	48
Brain	11	35
Liver	8	25
Pancreas	3	10
Subglottic	2	6
Spleen	1	3
Paraspinal	1	3
Orbital	1	3
Retroperitoneal	1	3
Bone	1	3

associated with multiple cutaneous hemangiomas. Segmental hemangiomas of the skin have a greater risk of association with structural anomalies such as those in PHACES syndrome.[6] There is an additional risk of association between segmental hemangiomas of the skin and visceral hemangiomatosis, potentially causing vital organ compromise.[7] Consequently, it is crucial to consider screening symptomatic

patients with PHACES syndrome for the presence of visceral hemangiomatosis. Our review revealed a high prevalence of GI hemangioma compared to other visceral hemangiomas amongst the same case series of confirmed cases of PHACES syndrome [Table 2]. Metry et al,[7] reported that the brain and the mediastinum are the most common sites of extracutaneous organ involvement with hemangioma in PHACES, followed by the GI tract. Since this reviewed series is limited to GI hemangioma and PHACES, it had a higher number of reported GI hemangioma than other visceral hemangioma. However, despite this limitation, it pointed to the likely association between GI hemangioma and other visceral hemangiomas in PHACES syndrome.

The most common clinical presentations of GI hemangioma are GI bleeding and anemia.[3,4] Interestingly, intussusception has not been previously reported as a presentation which makes our case unique.

CONCLUSION

There are no clear guidelines to recommend routine screening of patients with PHACES syndrome for the presence of extracutaneous hemangiomas. Future studies could possibly explore the usefulness of the addition of simple screening tests such as full blood count and fecal occult blood to the routine workup of all PHACES patients. Screening all symptomatic patients is crucial as GI hemangioma and other visceral hemangiomas are clearly associated with PHACES syndrome.

Disclosure

The authors declared no conflicts of interest. Consent was obtained from parents.

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