

Spontaneous Subaponeurotic Fluid Collection in an Infant

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Introduction

- Spontaneous subaponeurotic fluid collections (SSFCs) are rare, benign, self-limiting swellings under the scalp’s aponeurosis, mainly affecting infants under 12 months. They appear as soft, non-tender, mobile swellings, often over the posterior occiput, and extend beyond suture lines.^{1,2}
- Although harmless, SSFCs can mimic serious conditions such as child abuse, hydrocephalus, infections, brain tumors, or hemorrhagic disorders, causing significant concern for parents and clinicians and prompting unnecessary investigations.^{1,3}

Case Presentation

- A 10-week-old male infant presented with a scalp swelling/fluid collection in the left lateral occipitoparietal region, which appeared in the morning, prompting same-day outpatient evaluation.
- The fluid collection was soft, diffuse, nontender, fluctuant, with fluid thrill, and not limited by suture lines or presenting with associated bruising or erythema.
- He did not demonstrate any neurologic deficits and was delivered vaginally following 6 hours of dystocic labor with fetal scalp electrode monitoring.
- No swelling or abnormal fluid collections, injury, trauma, or hair manipulation was noted in the scalp.
- An ultrasound was scheduled but the fluid collection resolved spontaneously within 24 hours per mother.
- The fluid collection was subsequently identified as a spontaneous subaponeurotic fluid collection (SSFC).
- The patient demonstrated normal attainment of development milestones at the next well-child visit (4-month visit).



Figure 1. Spontaneous subaponeurotic fluid collection in a 10-week-old male infant (red arrow)

Discussion

- SSFCs extend beyond suture lines into the subaponeurotic space (**Figure 2**, **Figure 3**).¹
- Potential causes include lumbar punctures, minor birth traumas, or CSF leakage from microfractures, often associated with caesarian sections, complicated deliveries, and fetal scalp electrodes.^{1,3,6,7,8}

Study	Number of patients	Appx. Age at Presentation (weeks)	Location of SSFC	Diagnostic Findings	Outcome
Smith et al. (2016) ⁶	11	8-16	Occipitoparietal, frontal	US	Spontaneous resolution
Wang et al. (2016) ¹	9	8	Occipitoparietal	US	Spontaneous resolution
Schoberer et al. (2003) ¹¹	5	8-16	Occipitoparietal, frontal	US	Spontaneous resolution
Hopkins et al. (2002) ¹⁰	4	8	Occipitoparietal, temporal	US	Spontaneous resolution
Petraglia et al. (2010) ³	3	12-16	Occipitoparietal, frontoparietal	US, CT	Spontaneous resolution
Lee & Wenger (2018) ⁵	2	8-12	Occipitoparietal	US	Spontaneous resolution
Munjai & Kumar (2017) ²	1	12	Parietal	US	Spontaneous resolution
Abusaleem et al. (2024) ⁷	1	8	Occipitoparietal	US, CT	Spontaneous resolution
Vaibhav et al. (2010) ¹⁴	1	12	Parietal	US	Spontaneous resolution
St. Pierre-Hetz et al. (2023) ¹⁵	1	7	Occipitoparietal	CT, MRI	Spontaneous resolution
Medows et al. (2014) ⁴	1	14	Occipitoparietal	CT	Spontaneous resolution
Faried et al. (2021) ¹⁶	1	8	Occipital	US	Spontaneous resolution
Our case (2024)	1	10	Occipitoparietal	Resolved prior to US	Spontaneous resolution

SSFC = spontaneous subaponeurotic fluid collection; US = Ultrasound, CT= computed tomography

Table 1. Comparison of SSFCs across reviewed cases and our case report.

Discussion Cont.

- May mimic subgaleal hematomas, cephalohematomas, caput succedaneum, hydrocephalus, brain tumors, and meningitis (**Table 2**).^{3,9-16}
- Differentiation relies on location, timing, associated symptoms (e.g., increased ICP, focal deficits), and clinical context (**Table 1**, **Figure 4**).^{1,13-19}
- SSFCs generally resolve spontaneously within weeks to months, but our case demonstrated faster resolution (24 hours).^{7,8}
- Obstetric interventions like vacuum/forceps delivery may prolong resolution timelines.^{7,8}

Feature	Spontaneous Subaponeurotic Fluid Collection	Caput Succedaneum	Cephalohematoma	Subaponeurotic Hemorrhage
Location	Between periosteum and aponeurosis	Subcutaneous tissue of scalp	Between periosteum and skull	Between periosteum and aponeurosis
Nature of Fluid	Cerebrospinal fluid	Serosanguinous soft tissue edema	Hemorrhagic	Hemorrhagic
Consistency	Soft, fluctuating	Soft, pits with pressure	Firm	Fluctuant, boggy
Crosses Suture Lines	Yes	Yes	No	Yes
Complications	Typically benign, resolves spontaneously	Typically benign, resolves spontaneously	Typically resolves spontaneously, calcification, infection	Hemorrhagic shock, high mortality risk
Time to Resolution	Varies	Hours - days	Several weeks - months	Urgent intervention
Associated with Birth Trauma	Yes	Yes	Yes	Yes

Table 2. Comparison of soft tissue injuries in neonates.

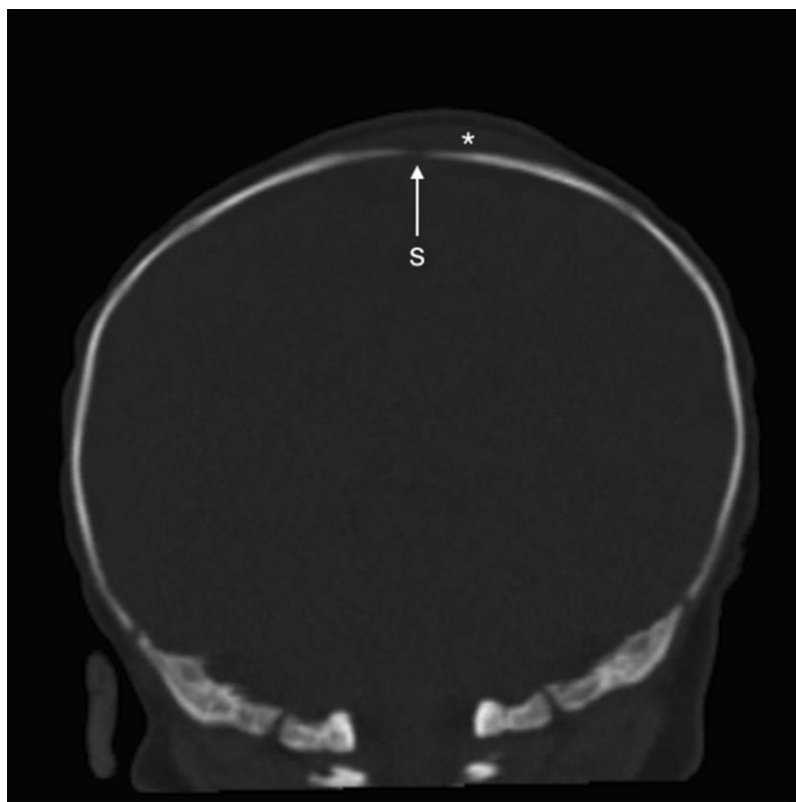


Figure 2. CT scan of the brain with subaponeurotic fluid collection (*) extending over the sagittal suture (s).⁵

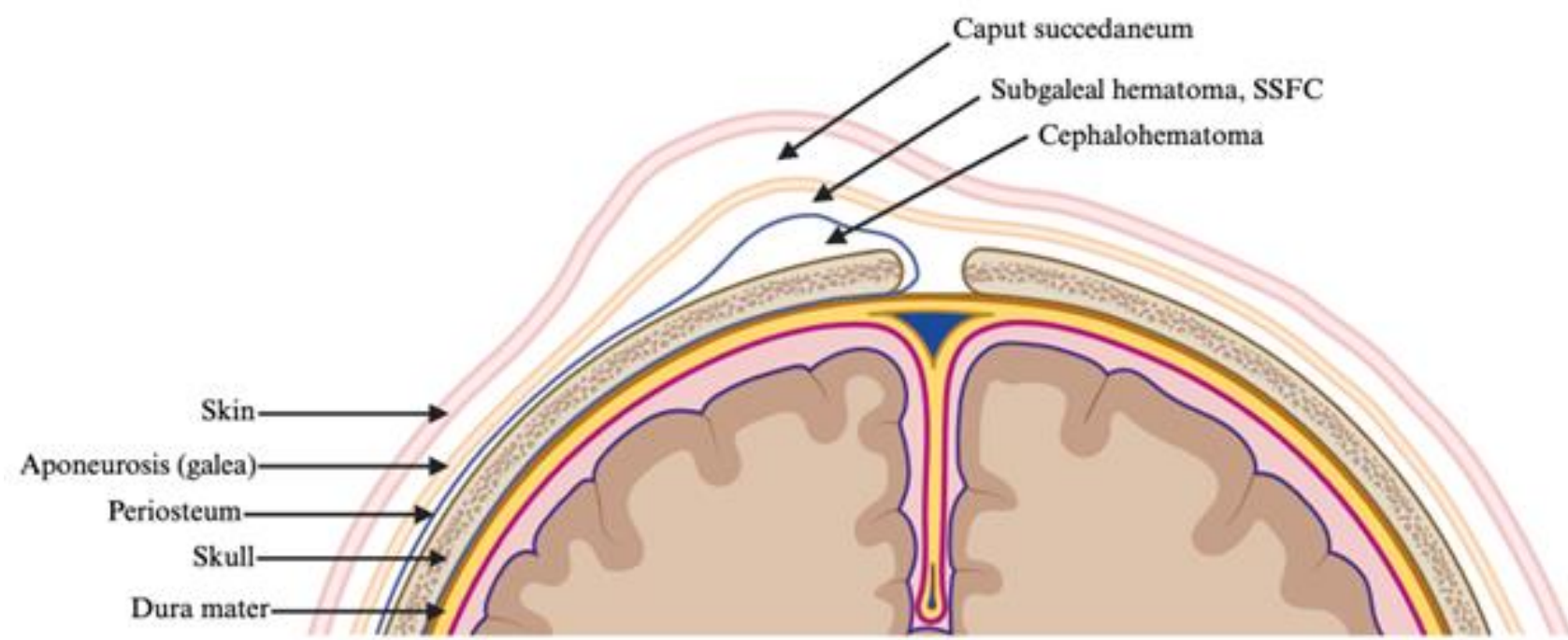


Figure 3. Location of fluid collections in cephalic soft tissue injuries in neonates. Created with BioRender.com.

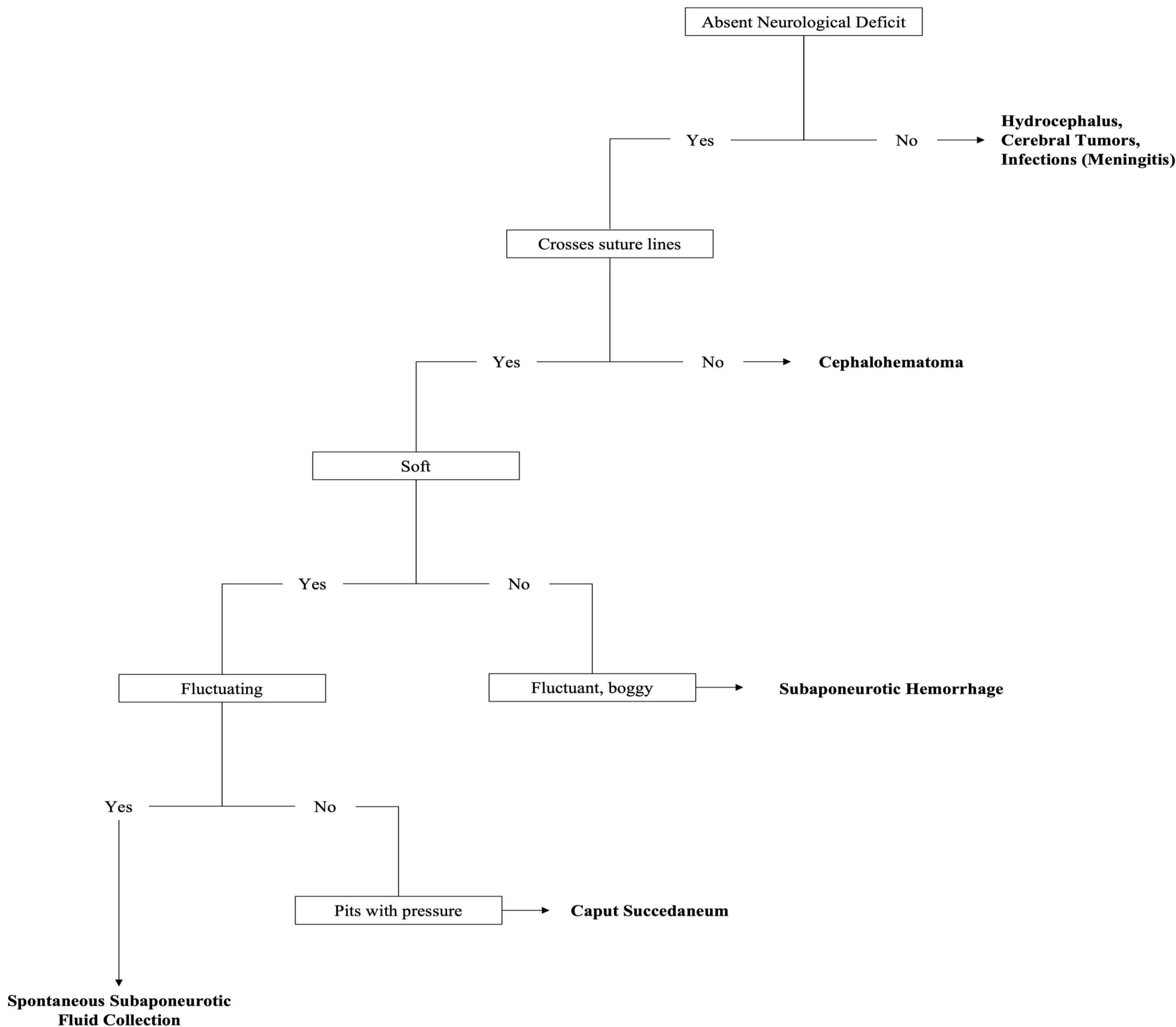


Figure 4. Algorithm for diagnosis of neonatal scalp swelling.

Conclusions

- Recognizing SSFCs as a distinct, benign, and self-limiting condition is crucial to avoid confusion with serious neonatal pathologies, and conservative management is recommended as SSFCs resolve spontaneously over hours to months.

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References

