

## CASE REPORT

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# A Case of Eosinophilic Granuloma Presenting as Post-traumatic Scalp Hematoma

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**ABSTRACT** Eosinophilic granuloma (EG) is a benign local bone disease. Here, we report a case of EG and describe the MRI findings which had progressed rapidly after minor head trauma. A 5-year-old healthy boy admitted to our clinic for a rapidly growing skull lesion. He had a minor head trauma history which occurred one month before admission. Computed tomography (CT) scan demonstrated a well defined lytic lesion on frontal bone. Our radiologic diagnosis was EG which was confirmed by the postoperative histopathologic diagnosis. Solitary EG lesions are a common form of Langerhans cell histiocytosis. Although the exact etiology of EG is not clear, autoimmune disorders, inflammation are considered to be etiological factors. Also, minor trauma is considered in etiologic factors. We can suggest with the posttraumatic radiological findings that the minor trauma may be a factor for initiation and aggravation on the pathways of development of EG.

**Keywords:** Eosinophilic granuloma; magnetic resonance imaging

Eosinophilic granuloma is a benign bone disease which is local. It is a mild form of Langerhans cell histiocytosis (LCH). Children, adolescents, and young adults are predominantly affected. The most common site of involvement is the skull.<sup>1</sup> Although eosinophilic granuloma (EG) can be asymptomatic and incidentally found, it can be seen as tender, growing scalp mass. A mild head trauma history before clinical symptoms is common.

Here, we report a case of EG and describe the magnetic resonance imaging findings which had progressed rapidly after minor head trauma.

## CASE REPORT

A 5-year-old healthy boy admitted to our clinic for a rapidly growing skull lesion. He had a minor head trauma history which occurred one month before admission. Since the bruising in the area of trauma resolved within several days after the trauma, the family did not seek medical attention. A palpable soft tissue mass in the scalp of the child developed one

month later. The family admitted to emergency department. The child never had seizure or neurologic deficits. Since the patient had a trauma history, the first line diagnostic modality was CT. The CT scan demonstrated a well-defined lytic lesion of the left side of frontal bone with a 2 cm mass having subcutaneous soft tissue density (Figure 1). The lesion was isointense compared to gray matter in T1 weighted images and heterogenous hyperintense in T2 weighted images (Figure 2). Following administration of intravenous contrast there was significant heterogeneous enhancement of the lesion (Figure 3). On diffusion weighted images (DWI) there were many millimetric diffusion restricted focuses (Figure 4). Since there was no significant hypointensity in the susceptibility weighted imaging (SWI) and no hyperintensity in the filtered phase image, bleeding was not considered (Figure 5). With all these findings and accompanying lytic bone lesion, the lesion was not reported as posttraumatic scalp hematoma. There was no other lesion in skeletal survey, abdominal USG and a chest radiography. Our radiologic diag-

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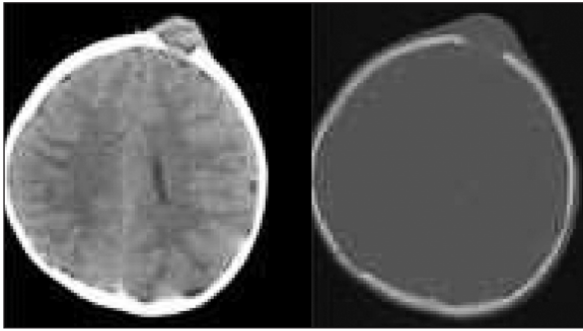
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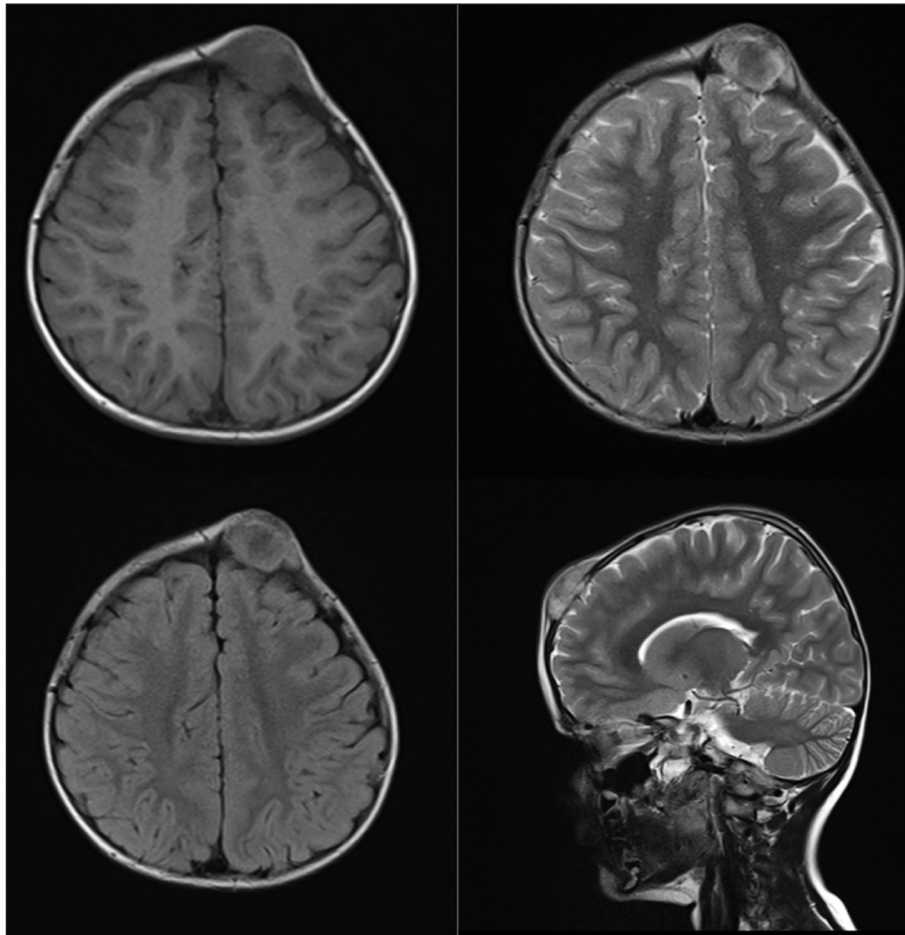


**FIGURE 1:** A) Axial CT brain window, B) Axial CT bone window. A well-defined lytic lesion of the left side of frontal bone with subcutaneous soft tissue density.

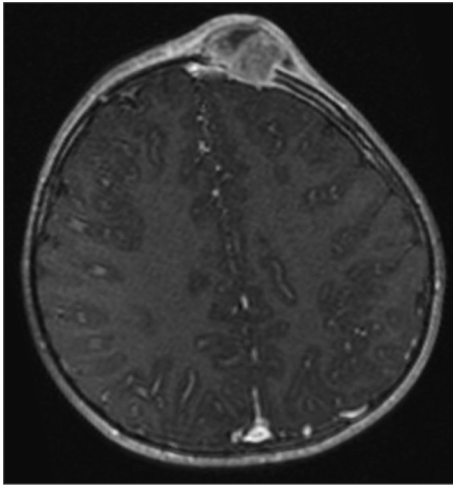
nosis was EG which was confirmed by the postoperative histopathologic diagnosis of the lesion which was totally resected. The family of the patient have given an informed consent for participation in this study.

## DISCUSSION

Solitary EG lesions are a common form of LCH. Usually plain film and/or CT have been used as radiological methods for evaluation. Brisman et al. described the role of radiology in the assessment of EG of the bone.<sup>2</sup> A centrally destructive, aggressive-looking lesions of the diseased bones on the plain films were the initially described findings. In the skull, the lytic lesions developed in the diploic space, might have scalloped, bevelled or confluent edges, or show a 'button sequestrum'.<sup>2,3</sup> CT scanning defines the extend of the disease better than plain films. Similar with the other various osteolytic lesions, punched-out radiolucent defect without reactive sclerosis or periosteal thickening is usually detected.<sup>4</sup> Although MR findings are nonspecific, frequently the lesion is hypointense in T1 weighted and hyperintense in T2



**FIGURE 2:** A) Axial T1-weighted image, B) Axial T2-weighted image C) Axial fluid attenuation inversion recovery (FLAIR) image, D) Sagittal T2-weighted image isointense lesion compared to gray matter in T1 weighted images and heterogenous hyperintense in T2 weighted images.



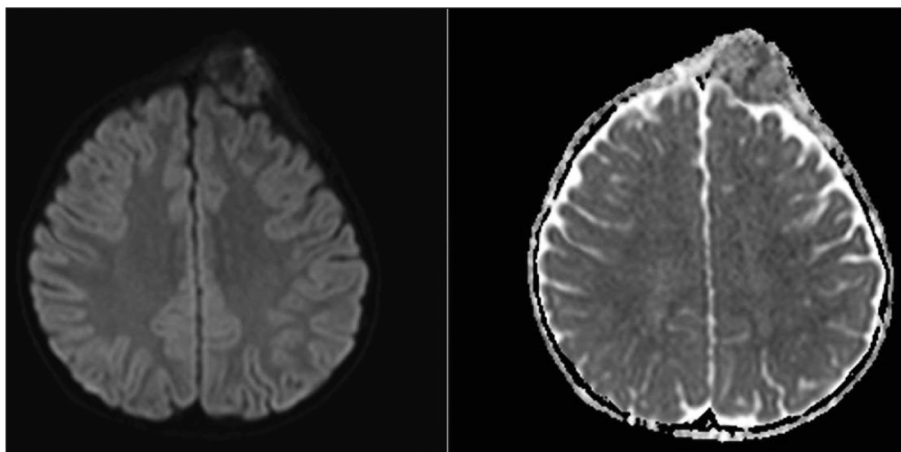
**FIGURE 3:** Axial postcontrast T1-weighted image heterogeneous contrast enhancement of the lesion.

weighted images. Homogeneous contrast enhancement which is not specific for EG can be visualised. In the acute and subacute phases like trauma, infection and osteonecrosis, hyperintensity in T2 weighted images around the lesion within the adjacent marrow and soft tissues can be seen because of edema and inflammation.<sup>5</sup> The enhancement patterns of EG in MR imaging have not been described in detail in the current literature.

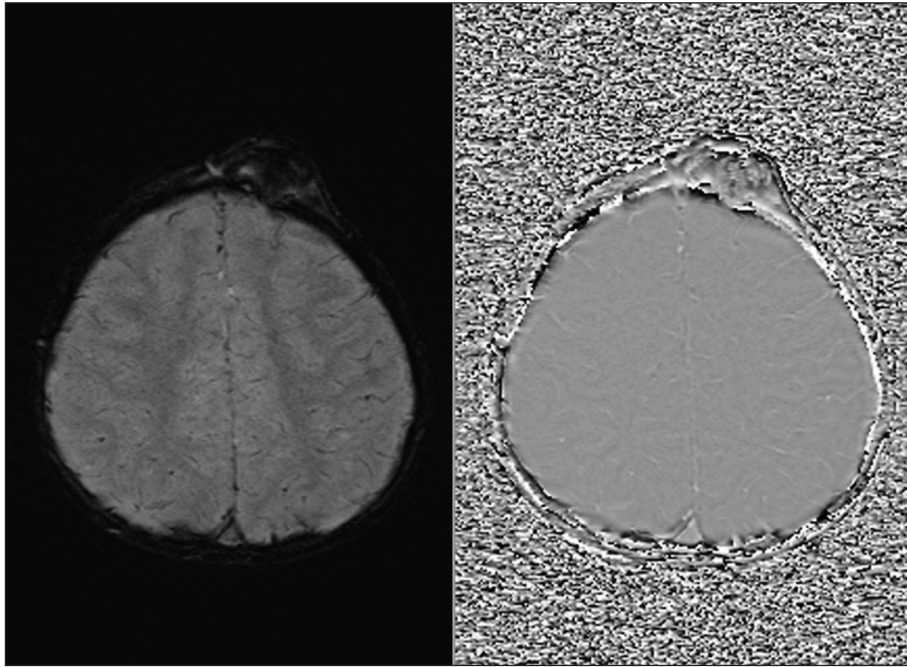
In children and young adults epidermoid or dermoid cysts, osteblastomas, haemangiomas or osteogenic sarcomas can be listed in the differential diagnosis of a solitary lytic skull lesions.<sup>6</sup> Usually there is a sclerotic rim around epidermoids and os-

teoblastomas.<sup>6</sup> A central radiolucent defect surrounded by a characteristic pattern of bony spicules is called honeycomb or sunburst appearance in haemangiomas. They do not have a sclerotic or beveled rim on plain films or CT.<sup>7</sup> Since the lesion occurred after a trauma, posttraumatic leptomenigeal cyst was also considered in differential diagnosis. Leptomenigeal cysts usually occur before the age of 3 years and are thought to be a late complication of head traumas. Intradiploic arachnoid cysts and growing fractures are the 2 different forms of leptomenigeal cysts. Leptomenigeal cysts are seen in patients with a history of trauma. Cystic lesions with a bone defect and gliosis in neighboring parenchyma is common.<sup>8</sup> Also these patients may have neurologic deficits which may progress in time and seizures.<sup>9</sup> There was no pathology in the neurological examination of our patient and there was no sign of skull fracture, brain herniation, dural defect or leptomenigeal cyst in the imaging studies.

EG is a granulomatous lesion and has an aggressive course. The reason of the massive accumulation of LCH at the site of the lesion is unclear. It may be because of either abnormal proliferation of these cells or the inflammatory responses initiated by activated LCH.<sup>10</sup> Although the exact etiology of EG is not clear, autoimmune disorders, inflammation and uncontrolled Langerhans cell replication are considered to be etiological factors.<sup>11</sup> Also, minor trauma is considered in etiologic factors. Six cases of EG associated with epidural hematoma have been reported



**FIGURE 4:** Diffusion-weighted image (DWI) many millimetric diffusion restricted focuses.



**FIGURE 5: A)** Susceptibility weighted Imaging (SWI), **B)** Filtered phase image no significant hypointensity in the susceptibility weighted imaging (SWI) and no hyperintensity in the filtered phase image.

and 4 of them had a trauma history.<sup>12</sup> In our case, hematoma or hemorrhage was detected neither in the CT and MRI images, nor in intraoperative exposure and histopathologic examination. Since the mass lesion did not occur and detected immediately after the trauma but diagnosed one month after trauma, we conclude that the lesion was not a coincidentally diagnosed post-traumatic lesion but the trauma can be an etiologic factor in occurrence of EG. Although the exact pathophysiological role of the trauma on the development of EG has not been described yet, we can suggest with the post-traumatic radiological findings that the minor trauma may be a factor for initiation and aggravation on the pathways of development of EG. Thus, for patients with signs and symptoms of mass lesions developing lately after trauma or patients having prior history of EG, careful observation and regular follow up is needed.

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#### **Conflict of Interest**

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

#### **Authorship Contributions**

**Idea/Concept:** Güleç Mert Doğan, Ahmet Sığırıcı; **Design:** Güleç Mert Doğan; **Control/Supervision:** Güleç Mert Doğan, Ahmet Sığırıcı; **Data Collection and/or Processing:** Güleç Mert Doğan; **Analysis and/or Interpretation:** Güleç Mert Doğan, Ahmet Sığırıcı; **Literature Review:** Güleç Mert Doğan; **Writing the Article:** Güleç Mert Doğan **Critical Review:** Ahmet Sığırıcı.

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