Pyogenic granuloma of the scalp arising from a retained bullet fragment after a contralateral skull-penetrating gunshot wound

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Abstract

Pyogenic granulomas are benign lesions commonly found on the skin and mucosal surfaces. Although the etiology of pyogenic granuloma is not well understood, some reports have suggested that PG may be caused by impaired wound healing following tissue injury. Rare cases of pyogenic granulomas in the setting of local foreign body have been reported in the literature. Although foreign body reactions have not been identified as a cause of pyogenic granuloma, these reports evidence the need to further investigate this association. We present a 33-year-old man who presented with a pyogenic granuloma on the scalp six years after a contralateral skull-penetrating gunshot wound that resulted in retained bullet fragments.

Keywords: foreign body, granuloma, gunshot, pyogenic, wound

Introduction

Pyogenic granulomas (PG), also known as lobular capillary hemangiomas, are benign lesions commonly found on the skin and mucosal surfaces [1]. The etiology of these lesions is not well understood, as evidenced by its two names suggestive of competing theories: lobular capillary hemangioma suggests tumorigenesis, while pyogenic granuloma suggests reactive disease [2]. However, reports have suggested that pyogenic granulomas may be caused by impaired wound healing following tissue injury [3]. To date, only a few cases of pyogenic granuloma occurring in the setting of retained foreign bodies have been described in the literature. Herein, we present a pyogenic granuloma that developed on the scalp of a man who had survived a skull-penetrating gunshot wound on the contralateral side six years prior.

Case Synopsis

A 33-year-old man presented to dermatology clinic for evaluation of a recurrent painful skin lesion on his left vertex scalp. The lesion had previously been diagnosed as a pyogenic granuloma via shave removal, after which it quickly recurred. He had sustained a gunshot wound to the right side of his head six years earlier, which required right parietal craniectomy and reconstruction. Physical examination showed a 1×1cm exophytic red nodule on the left vertex scalp overlying an ill-defined, easily compressible 3cm soft mass (**Figure 1**). Review of previous X-ray after his gunshot wound revealed opaque metallic foreign bodies in the same area (**Figure 2**). Ultrasound of the scalp was performed to determine if his skin lesion shared any connection with the cranial vault, which showed an underlying 3cm subcutaneous fluid collection. Additional round, hyperechoic structures were noted, suggestive of foreign bodies with surrounding fluid. A computed tomography scan with dual energy for metal suppression images was performed, which showed soft tissue polypoid nodularity along the

Figure 1. *A 1×1cm exophytic red nodule on the left vertex scalp.*

skin surface of the left posterior vertex scalp, overlying a large metallic fragment in the scalp soft tissues. The calvarium underlying the extracranial metallic fragment was intact and there were no identifiable intracranial abnormalities. After verifying the absence of an intracranial connection, excision of the lesion was performed, revealing an intact bullet that was successfully removed (**Figures 3**, **4**). Given the history of the injury and imaging findings, the bullet likely traversed through the inferior portion of the right parietal bone, through the right parietal lobe in an upwards fashion, and out of the superior portion of the right parietal bone until it lodged in the subcutaneous layers to the right of the sagittal suture line. Pathology findings of the submitted excision specimen showed dense mixed infiltrate of histiocytes, acute inflammatory cells, lymphocytes, occasional giant cells, and vascular hyperplasia, consistent with pyogenic granuloma (**Figure 5**). At follow-up 10 months after excision, there was no recurrence at the operative site.

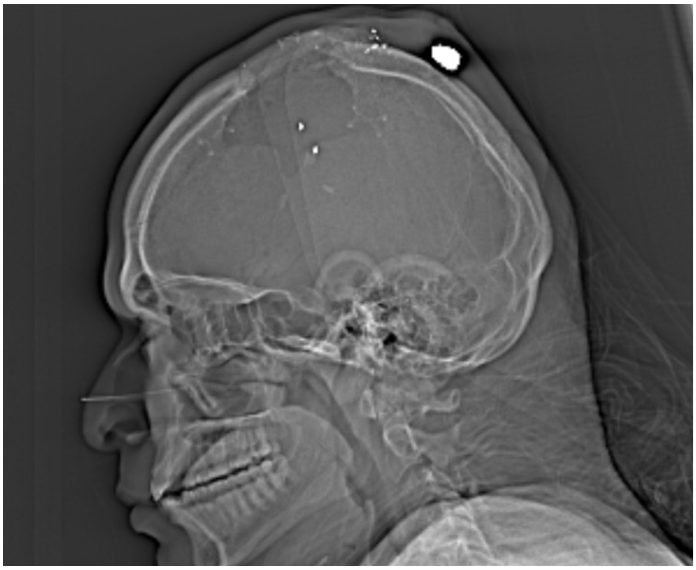

Figure 2. *Sagittal skull X-ray shows the presence of several bullet fragments in the scalp, visible as hyperechoic areas. A portion of the skill is missing at the vertex due to damage from the gunshot wound.*

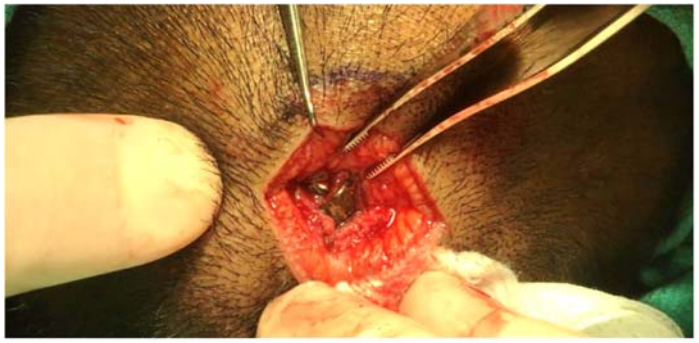

Figure 3. *Bullet fragments present in the left vertex scalp during pyogenic granuloma excision.*

Case Discussion

Pyogenic granulomas are commonly acquired vascular tumors that arise in the skin and mucous membranes [1]. They can occur spontaneously, within prior vascular malformations and after trauma

Figure 4. *Excised bullet fragment after six years of being embedded in scalp tissue.*

[3]. Pyogenic granulomas typically present as solitary, red, exophytic papules or nodules, which may be pedunculated. They tend to grow rapidly and may ulcerate or bleed [1].

Although recurrence of lesions may occur, there are multiple effective treatment options for pyogenic granulomas, including shave removal. Other effective therapies include curettage, ligation, laser surgery, and electrodesiccation [3,4]. Topical beta-adrenergic receptor antagonists such as timolol and propranolol can also be used [3]. Currently, the mainstay of treatment is local excision owing to the risk of local recurrence [3].

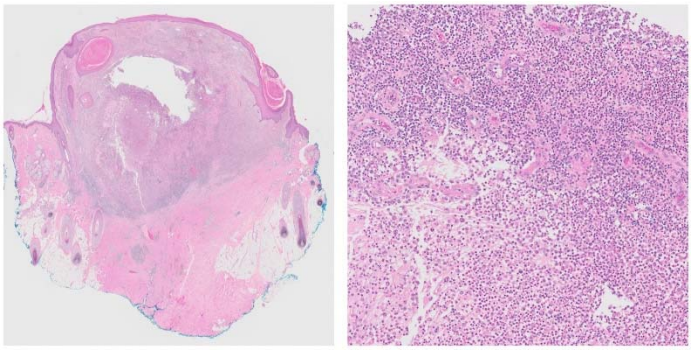

Figure 5. *Histopathology from the excision specimen demonstrates a nodular protuberance containing a dense mixed infiltrate of histiocytes, acute inflammatory cells, lymphocytes, occasional giant cells, and vascular hyperplasia, consistent with pyogenic granuloma and foreign body reaction. H&E, 1×, 10×.*

Few cases of pyogenic granuloma in the setting of local foreign bodies have been reported in the literature. One case describes a pyogenic granuloma associated with exposed sternal wires placed after coronary artery bypass surgery, which resolved only after the wires were tightened and repositioned [5]. One pediatric case report describes a pyogenic granuloma of the finger that recurred despite silver nitrate cautery, diathermy, and surgical excision; it only resolved after the removal of an underlying wooden splinter [6].

Conclusion

Our case supports the existing evidence that foreign bodies may precipitate pyogenic granulomas and highlights the apparent necessity of complete removal of the foreign body to achieve permanent resolution of the associated pyogenic granuloma. Additionally, this case highlights pre-operative considerations for clinicians faced with surgical management of foreign body-associated pyogenic granuloma of the scalp.

Potential conflicts of interest

The authors declare no conflicts of interests.

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