Subcutaneous Granuloma Annulare of the Scalp: A Case Report and Case Review

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GOAL

To understand subcutaneous granuloma annulare (SGA) to better manage patients with the condition

OBJECTIVES

Upon completion of this activity, dermatologists and general practitioners should be able to:

1. Explain the clinical presentation of SGA.
2. Describe the histopathology of SGA lesions.
3. List the differential diagnosis for SGA.

CME Test on page 372.

This article has been peer reviewed and approved by Michael Fisher, MD, Professor of Medicine, Albert Einstein College of Medicine. Review date: November 2005.

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Drs. Hutcheson, Hurray, Smith, and Shannon report no conflict of interest. The authors report no discussion of off-label use. Dr. Fisher reports no conflict of interest.

Subcutaneous granuloma annulare (SGA) is a benign inflammatory disorder that may be alarming in its presentation because of its rapid growth and extensive differential diagnosis. The purpose of our study was to improve the appropriate evaluation and management of pediatric patients with subcutaneous scalp nodules. This article presents the clinical presentation, histopathologic data, evaluation, and management of a patient with subcutaneous scalp nodules diagnosed as SGA. Additionally, the clinical data of all other cases of SGA diagnosed at our institution over a 9-year period were reviewed. The majority (72%) of SGA patients encountered at our facility were children. Most of the SGA lesions were located on the extremities; however, all of the lesions located on the scalp were in children. This article reviews the differential diagnosis and workup of scalp nodules. In evaluating the patient with subcutaneous scalp nodules, we conclude that SGA should be added to the differential diagnosis.

Cutis. 2005;76:377-382.

Accepted for publication October 26, 2005.

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In the long differential diagnosis of scalp nodules in children, subcutaneous granuloma annulare (SGA) generally is not included. In our dermatology clinic, we encountered a young child who presented with multiple evolving subcutaneous nodules of the scalp that, after evaluating the results of a biopsy, were determined to be SGA.

Case Report

A 15-month-old white girl presented with subcutaneous scalp lesions. The patient's mother noted the nodules had appeared 5 to 6 months prior over a period of several days following an episode of pneumonia. Her mother also noted that the lesions had appeared "swollen" and had decreased in size over several weeks prior to presentation. Drainage was never noted, but the nodules were tender. The patient's medical history was notable for pneumonia that occurred 5 to 6 months prior to presentation, sleep apnea, ear infections, and reflux. The patient had no significant family or social history. The review of systems was negative for any constitutional symptoms including fever, chills, weight loss, night sweats, and visual or neurologic abnormalities.

The patient originally presented to her pediatrician, whose initial clinical differential diagnosis included dermoid cysts, histiocytosis, neuroblastoma, and epithelioid sarcoma. The workup included a complete blood count, differential white blood cell count, sedimentation rate, comprehensive metabolic panel, and serum ferritin levels, results of which were all within reference range. Results of a skull radiograph demonstrated ill-defined lucencies overlying the posterior parietal and inferior occipital bones on the lateral view. This was followed by a computed tomography of the head taken with and without contrast, the results of which demonstrated normal sutures with no evidence of intracranial masses or bony lesions. The patient was referred to the departments of pediatric neurosurgery and hematology-oncology, which recommended and performed an excisional biopsy with the patient under general endotracheal anesthesia. Pathology results, discussed later in detail, showed features consistent with granuloma annulare. The biopsy specimen also was examined for the presence of abnormal lymphocytes, and no evidence of B-cell light chain restriction, abnormal T-cell immunophenotype, or clonal T-cell expansion was found. At this point, the patient was referred to dermatology and seen in our clinic for consultation.

Histologic sections stained with hematoxylin-eosin (H&E) demonstrated loosely arranged areas of granulomatous inflammation primarily consisting of lymphocytes and histiocytes. Focally, the lymphocytes and histiocytes formed loose palisades next to areas of necrosis in the dermal collagen (Figure 1). The granulomatous inflammation was present adjacent to skeletal muscle. There were occasional areas of clearing dispersed throughout both the inflammation and the adjacent dermal collagen. These areas of clearing contained a wispy, faint basophilic material (Figure 2). Suspected mucin deposition in these cleared areas was confirmed by positive staining results with colloidal iron (Figure 3). Results of a diastase periodic acid-Schiff stain for fungus was negative, as was an auramine-rhodamine stain for acid-fast bacilli. No epidermis was present on the biopsy specimen.

Results of a physical examination revealed the patient was an active, healthy-appearing, white female child within the normal limits for weight and height. Results of a total-body skin examination was

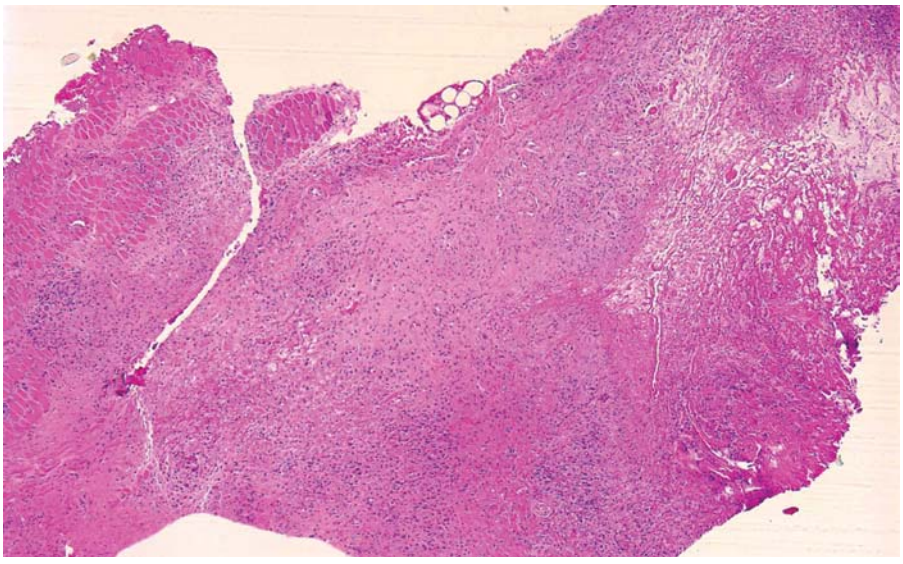

Figure 1. Loosely organized palisading granulomatous inflammation adjacent to skeletal muscle (H&E, original magnification ×40).

unremarkable except for multiple firm, adherent subcutaneous nodules that were tender and distributed on the patient's anterior hairline and throughout her scalp. Erythema was not noted. No other nodules were seen on the rest of the patient's body, and no lymphadenopathy was detected. Clinically, the results of her examination were consistent with SGA, and the histopathology results confirmed the diagnosis.

Treatment options for this patient included topical corticosteroids, intralesional corticosteroids, and excision (which would have required general anesthesia). Extensive counseling was provided to the patient's mother regarding the benignity of the lesions. Because there were numerous lesions, a decision was made to pursue conservative management. Hydrocortisone valerate 0.2% cream applied twice daily was prescribed. At follow-up 7 months later, the lesions had resolved.

Case Review

Because SGA is uncommon and often is mistaken for more alarming entities, we believed it would be beneficial to examine other cases of SGA encountered at our facility. With approval from our internal review board, we reviewed clinical data from July 1995 through June 2004 of all patients who had histopathologic reports labeled as SGA; deep granuloma annulare; or palisading granuloma without evidence of rheumatoid disease, gout, or infection. The location of the lesions on which biopsies were performed, the number of lesions, evidence of recurrence, as well as the age, sex, and race of the patients were noted. Histopathologic slides were reviewed and the stains that were obtained were noted. These data are found in Table 1.

Within this 9-year period, 25 patients were identified who had histopathology demonstrating deep

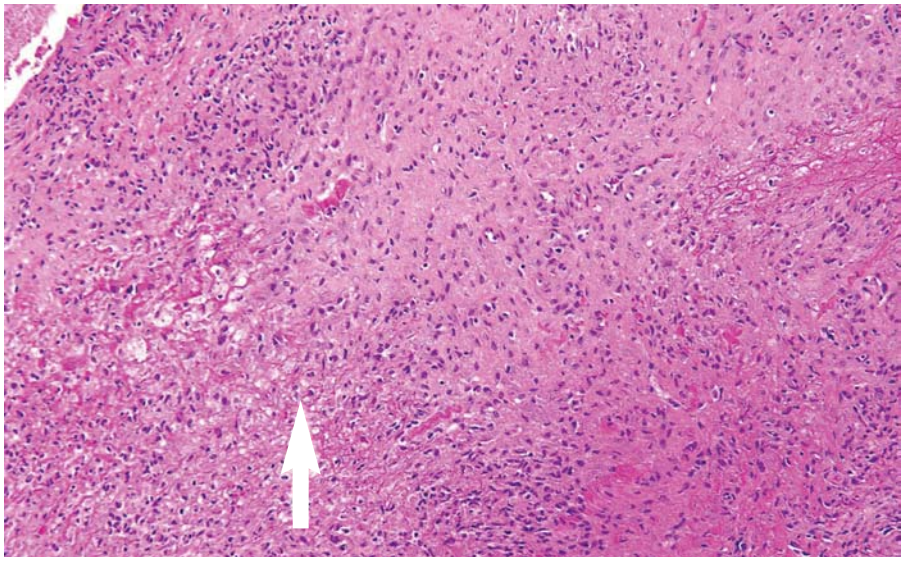

Figure 2. Granulomatous inflammation with areas of mucin deposition (H&E, original magnification ×100).

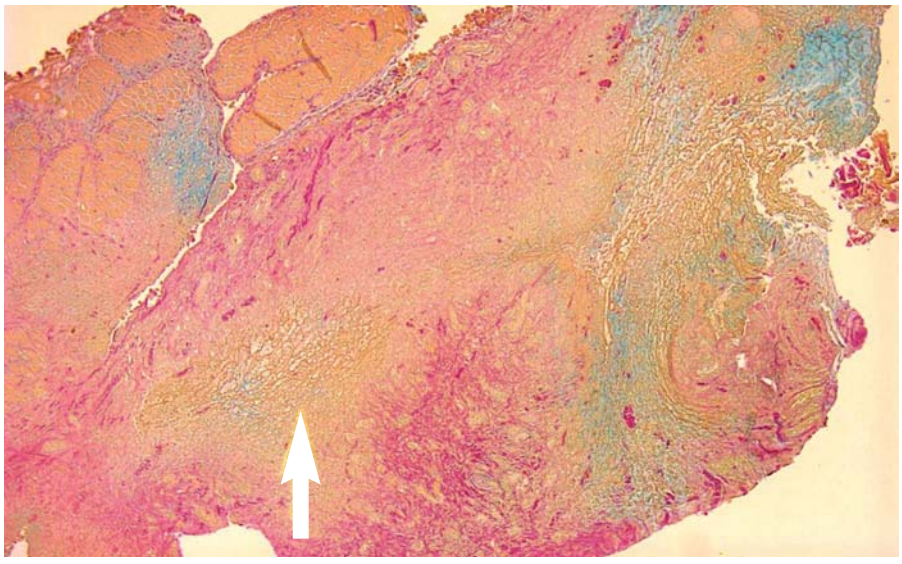

Figure 3. Mucin deposits surrounding an area of loosely formed, palisading granulomatous inflammation (colloidal iron, original magnification ×40).

Table 1.

A Case Review of Subcutaneous Granuloma Annulare: Clinical and Histochemical Staining Data*

Patient	Age (Sex)	Race	Lesion Location	Note	Stain Results		
					Colloidal Iron	Auramine-Rhodamine/ Acid-fast Bacilli	Periodic Acid-Schiff/Grocott Methenamine Silver
1	15 mo (F)	W	Scalp, pericranial	Multiple	+	–	–
2	2 y (F)	B	L forearm		+	–	
3	9 y (F)	W	R lower leg	Recurrent			
4	4 y (F)	B	L wrist				
5	11 y (F)	W	L forearm		+		
6	12 y (F)	B	R forearm		+	–	–
7	2 y (F)	B	R leg	Multiple	+		
8	3 y (M)	W	Scalp, pericranial	Multiple	+		
9	4 y (M)	W	L pretibial	2			
10	12 y (M)	B	L knee		+		
11	56 y (F)	W	Suburethral		–	–	
12	4 y (F)	W	Scalp, several locations	Multiple	+	–	–
13	11 y (M)	W	L index finger		+	–	–
14	2 y (F)	W	R index finger		+	–	–
15	4 y (M)	B	L and R arm	Multiple/recurrent	+		
	3 y (M)	B	R palm	Multiple	+	–	–
16	5 y (M)	W	R lateral leg		+	–	–
17	NA (F)	NA	R elbow				
18	71 y (M)	O	R lateral thigh/hip	Consult			
19	3 y (M)	W	Scalp	Consult			
20	19 mo (F)	B	Subbrow		+	–	–
21	26 y (F)	W	R knee		+		
22	54 y (F)	B	L shin		+		
23	31 y (F)	W	L leg		+		
24	2 y (F)	W	Scalp				
25	38 y (F)	O	Near R lateral canthus		+	–	–

*F indicates female; M, male; W, white; B, black; O, other; L, left; R, right; +, positive; –, negative; NA, not available.

Table 2.

Demographics and Lesion Locations of Patients With Subcutaneous Granuloma Annulare

	N=25
Age	
Range	15 mo–71 y
Average	15.45 y
Sex, n (%)	
Female	17 (68%)
Male	8 (32%)
Race,* n (%)	
White	14 (56%)
Black	8 (32%)
Other	2 (8%)
Site, n (%)	
Scalp	5 (20%)
Upper extremity	8 (32%)
Lower extremity	9 (36%)
Face	2 (8%)
Suburethral	1 (4%)

*Not available for one patient.

Table 3.

Differential Diagnosis of Nodules and Subcutaneous Scalp Lesions in Infants and Children

- Abscess
- Aplasia cutis congenita (keloid/scar)
- Cephalocele
- Cephalohematoma deformans
- Cranial fasciitis of childhood
- Cyst (dermoid, epidermoid)
- Dermal sinus tumor
- Eosinophilic granuloma
- Hemangioma
- Heterotopic brain tissue
- Leptomeningeal cyst
- Lipoma
- Meningioma
- Metastases
- Osteoma
- Palisading granuloma (subcutaneous granuloma annulare)
- Pilomatricoma
- Primary sarcoma
- Sinus pericranii
- Traumatic granuloma

palisading granulomas. A colloidal iron stain was performed on biopsy specimens taken from 18 of the 25 cases, and 100% of those results were positive. Stains for acid-fast bacilli and fungus were performed on specimens from 11 and 10 cases, respectively, and all had negative results. Of the 25 cases, stains for mucin, fungus, and acid-fast bacilli were performed concurrently on specimens from 8 (32%) cases.

A summary of demographics and lesion sites is outlined in Table 2. Although most patients were children, 7 (28%) were adults. The mean age of our patients was 15 years, with a range of 15 months to 71 years. The lesions on which biopsies were performed were located predominately on the extremities (18/25; 72%), with scalp lesions present in 20% of the patients (5/25). Notably, only children had SGA on the scalp. More than half of the patients (15/25; 60%) were white; the remainder were classified as either black (9/25; 36%) or other (2/25; 8%). The majority of the patients (16/25; 64%) were female.

Comment

SGA is a benign inflammatory dermatosis consisting of deep dermal and/or subcutaneous nodules that may lie in close proximity to underlying muscles and bone. SGA is an uncommon form of granuloma annulare and is predominantly, but not exclusively, found in children.[1] It most commonly is located on the extremities, particularly the legs,[2] but it also can be found on the scalp and forehead.[1,3,4] In the present study, SGA was found most commonly on the upper

and lower extremities (Table 2). This condition generally is accepted as affecting males more often than females,[5] though the majority of our patients were female, and there are other reports of a female preponderance.[6,7]

The differential diagnosis of SGA in general includes rheumatoid nodules, rheumatic fever nodules, epithelioid sarcoma, subcutaneous sarcoidosis, and deep granulomatous infections. The differential diagnosis of subcutaneous nodules on the scalp of infants and children is outlined in Table 3. It is well established in the literature[8] that nodules and subcutaneous lesions of the scalp are common in children, with most lesions being epidermal cysts. However, clinical concern necessitating careful evaluation is warranted when a subcutaneous nodule is encountered in an infant or child, because complications of these lesions can include bony deformity or intracranial involvement; also, not all of the lesions in the differential diagnosis are benign.[4,9,10] In addition to a thorough history, a review of systems, a physical examination, and laboratory studies, Baldwin et al[8] outlined a workup that included radiologic studies, including a computed tomography scan if a biopsy or excision is desired. Neurosurgical consult should be obtained with lesions present at birth, with midline location and/or with associated neurologic signs and symptoms, with the presence of abnormal hair, and with transillumination and turgor changes. The performance of aspiration and dye studies should be reserved for cases where the needed diagnostic information cannot be obtained by other methods. Excision often is performed because of the clinical suspicion of malignancy,[11] which possibly is exacerbated by the fact that the nodules can increase in size and number.

Conclusion

Although patients with SGA often present to the dermatologist late in the diagnostic process, it is important to complete the diagnostic workup with a thorough review of laboratory, radiographic, and pathologic analyses. In the evaluation of patients with scalp SGA, dermatologists can be invaluable by confirming the benign nature of this dermatosis, as well as by confirming that there is no association with malignancy or systemic disease[12]; additionally, dermatologists can provide reassurance to patients and their families that SGA is a benign condition.

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