

# Ossification Associated With Melanocytic Nevi

BAHRAM AZADEH, MD, FRCPath, AND  
HASSAN AL ABDALLAH, MD\* DOHA, QATAR

*From; Departments of Pathology and Dermatology\*  
Hamad Medical Corporation, Doha, Qatar.*

## SUMMARY

The aim of this work is a systematic study of the incidence and pathological features of ossification in benign melanocytic nevi in an attempt to understand its pathogenesis. Clinical and histopathological features of all melanocytic nevi, with or without ossification resected during a 5 year period were studied.

Ossification islands in 59 of 78 melanocytic nevi from 52 (8.7%) individuals occurred on face 53 (90%), retroauricular 3, neck 2, and ear lobe 1 (F/M ratio 4/1). One to seven (average 2) ossification centers involved mid-dermis to superficial subcutis showing fatty marrow without haemopoiesis in 17 (28%) lesions, preossified centers in 11 nevi in 8 (15%) cases and foreign body granulomatous reactions in 21 nevi in 20 (38%) cases. (Hair fragments in granulomata alone 6, in bony islands alone 2, in both 3). Demodex follicularum was seen in 17 (23% in females and 62% in males). Of the 545 cases of melanocytic nevi without ossification, 16 (3%) showed foreign body granulomatous reactions to ruptured follicular cysts and hair fragments. Demodex infestation as observed in 83 out of 396 cases with face and neck nevi (21% in both genders).

Ossification and foreign body granulomatous reactions in melanocytic nevi, together or alone, occur virtually always in face and neck lesions, predominantly female

patients. Damage to hair follicles (e.g. due to plucking) appears to result in foreign body granulomatous reactions and degenerative changes, eventually leading to induction of ossification in some melanocytic nevi.

## Introduction

Ossification in melanocytic nevi, known as osteonevus of Nanta has been briefly described in standard dermatopathological texts,<sup>1,2</sup> but systematic studies of this association are rare in the English literature. Ossification in nevi occurs virtually always on the face<sup>3-6</sup> but is usually not apparent clinically, and is found incidentally when nevi so affected are examined histologically.<sup>7</sup> There has been some speculation relating this complication in nevi to folliculitis in which degenerative tissue serves as the inducing factor for ossification. Ruptured or damaged hair follicles and the resulting foreign body granulomatous reactions appear to play a central role in the pathogenesis of this phenomenon.<sup>8</sup>

The work reported here was initiated to assess the incidence and clinicopathological features of "osteonevus" in a systematic review of all melanocytic nevi resected in the State of Qatar during years 1988 to 1992.

## Material and Methods

Histological sections in the files of



Department of Pathology, Hamad Medical Corporation, Doha, of all benign melanocytic nevi excised in the State of Qatar during years 1988 to 1992 (inclusive) were reviewed for the presence of ossification. Age and sex of the patients, and site of the nevi were recorded. Histological features studied included the following parameters: evidence of nevi being congenital or not, intradermal or compound, frequency of hair follicles in the biopsy, number of ossification islands and cutaneous level of involvement, presence of fatty marrow, hemopoietic elements, telangiectasia and solar elastosis, foreign body granulomatous reactions, hair in granulomata and in bony islands, and Demodex follicularum infestation of the hair follicles.

**Results**

Some of the clinicopathological features of nevi with bone are compared with those without bone in Table 1.

During the years 1988 to 1992 (inclusive),

nevi from 597 individuals (379 females and 218 males) were examined. Islands of ectopic ossification were seen in 59 out of 78 nevi resected from 52 (8.7%) individuals (Female: Male ratio 3:1). Female's age ranged from 20 to 50 (mean 33.8) years, and males' age ranged from 26 to 50 (mean 41.5) years. All lesions were on the head and neck regions; 53 (90%) on the face; three in the retroauricular region; two in the neck; and one on an ear lobe. Of the 53 nevi on the face, 26 occurred on the cheeks, 9 on and around the nose, 8 on the chin, 6 on preauricular region, and one each on forehead, eyebrow, upper lip and lower lip.

All lesions were from skin regions rich in hair follicles. They were "small" (12% compound and 88% intradermal), and appeared to be congenital by histological criteria which included nevus cells intimately associated with adnexal structures but relatively sparing papillary dermis.<sup>7,9</sup> One to seven (average of two) bony islands were present in each lesion involving the

**Table 1.** Site, Sex, Foreign body granulomatous reaction and Demodex follicularum in melanocytic nevi with and without ossification.

	With Ossification			Without Ossification		
	Male	Female	Total	Male	Female	Total
Head & Neck %	13	39	52	142	254	396
			<b>100%</b>			<b>73%</b>
Other Sites	-	-	-	58	75	133
Sites	-	-	-	5	11	16
N.R.						
Total	13	39	52	205	340	545
Compound%#	3	3	6	43	38	81
			<b>12%</b>			<b>15%</b>
Granuloma*%	6	20	5**	11	16	
			<b>38%</b>			<b>3%</b>
Demodex*%	8	9	17	30	53	83
	<b>61%</b>	<b>23%</b>	<b>33%</b>	<b>21%</b>	<b>21%</b>	<b>21%</b>

Sites N.R.: Sites not recorded.

\*All on face except \*\*(3 face, 1 abdomen, 1 scrotum).

# In multiple nevus resections, intradermal nevi sometimes were also present in the same individual.



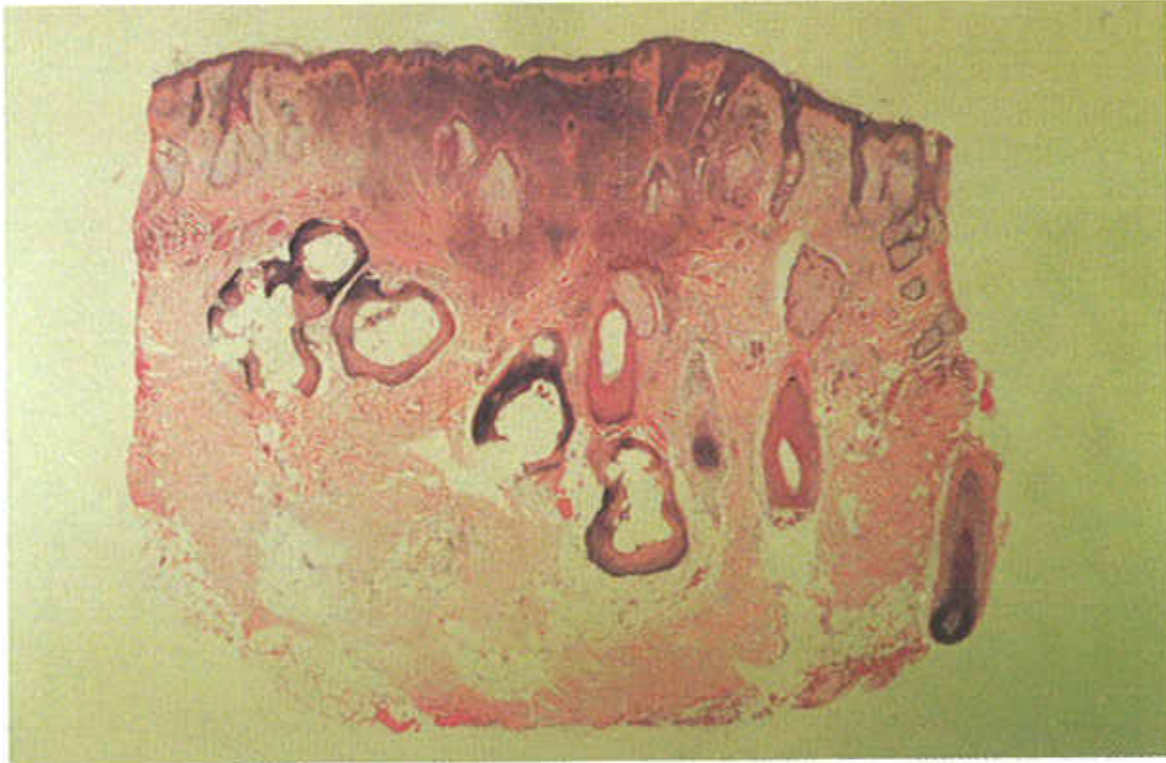


Fig.1: Multiple ossification centers with fatty marrow in an intradermal melanocytic nevus x8.

mid-dermis in 13, deep dermis in 51 and superficial subcutis in 16 biopsies (Fig. 1). Fatty marrow was present in bony islands in 17 (28%) of the biopsies. There was no hemopoietic element in any of the biopsies. Grayish blue semicrystalloid preossified foci (Fig. 2) with or without multinucleated giant cells were observed in 11 nevi in 8 cases. Evidence of solar elastosis was seen in ten, and telangiectasia in seven biopsies.

Foreign body granulomatous reactions were present in 21 nevi in 20 (38%) cases (16 females and 4 males), showing hair fragments in granulomata in nine cases, associated with hair fragments in bony islands in three (Fig. 3,4). Hair fragments in bony islands were also present in two additional cases without any

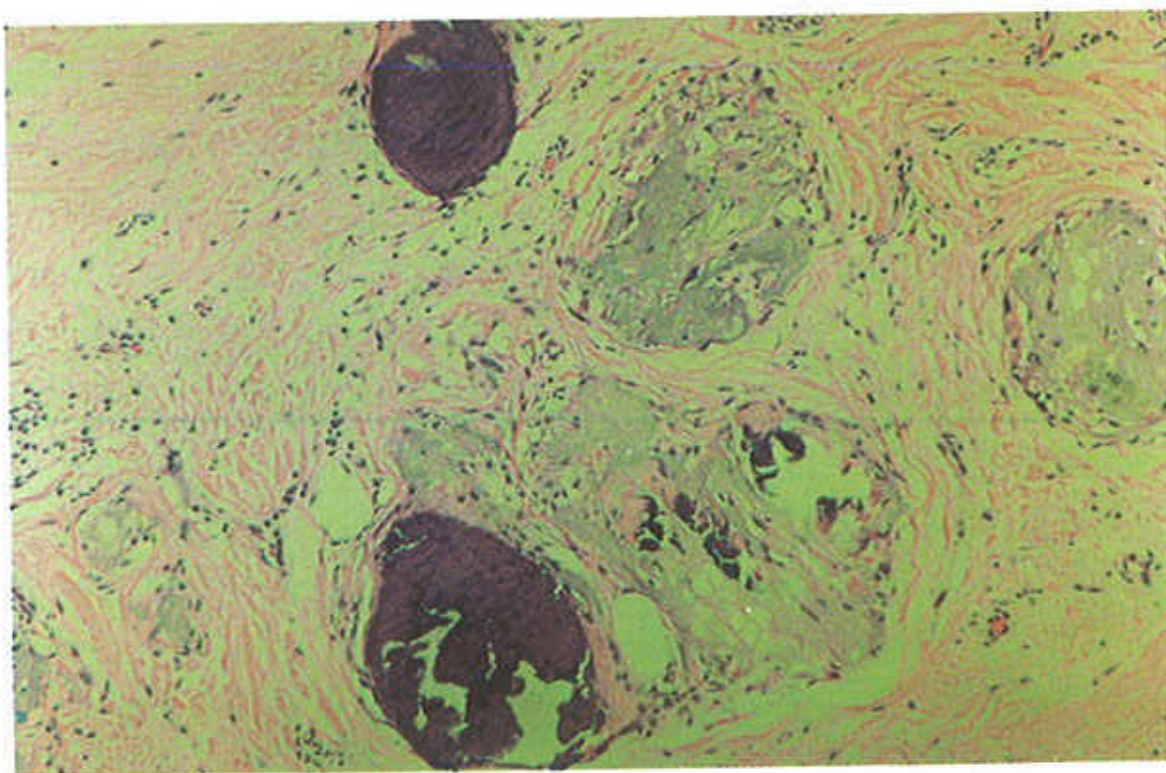


Fig.2: Ossified and preossified centers in a melanocytic nevus x25.

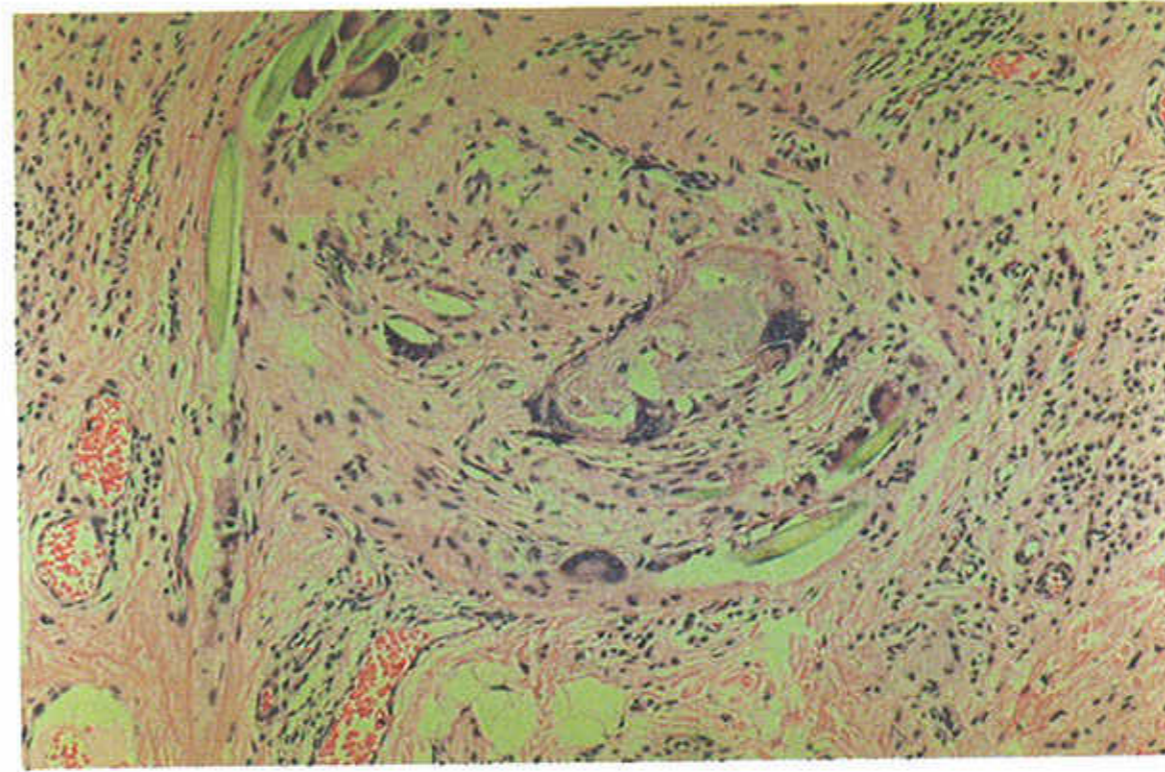


Fig.3: Coarse hair fragments in granulomata and in a bony island in a melanocytic nevus x50.

granulomata in the lesions. In all, 11 cases (7 females, 4 males) had hair fragments in the nevi (in granulomata alone 6, in bony islands alone 2, in both 3).

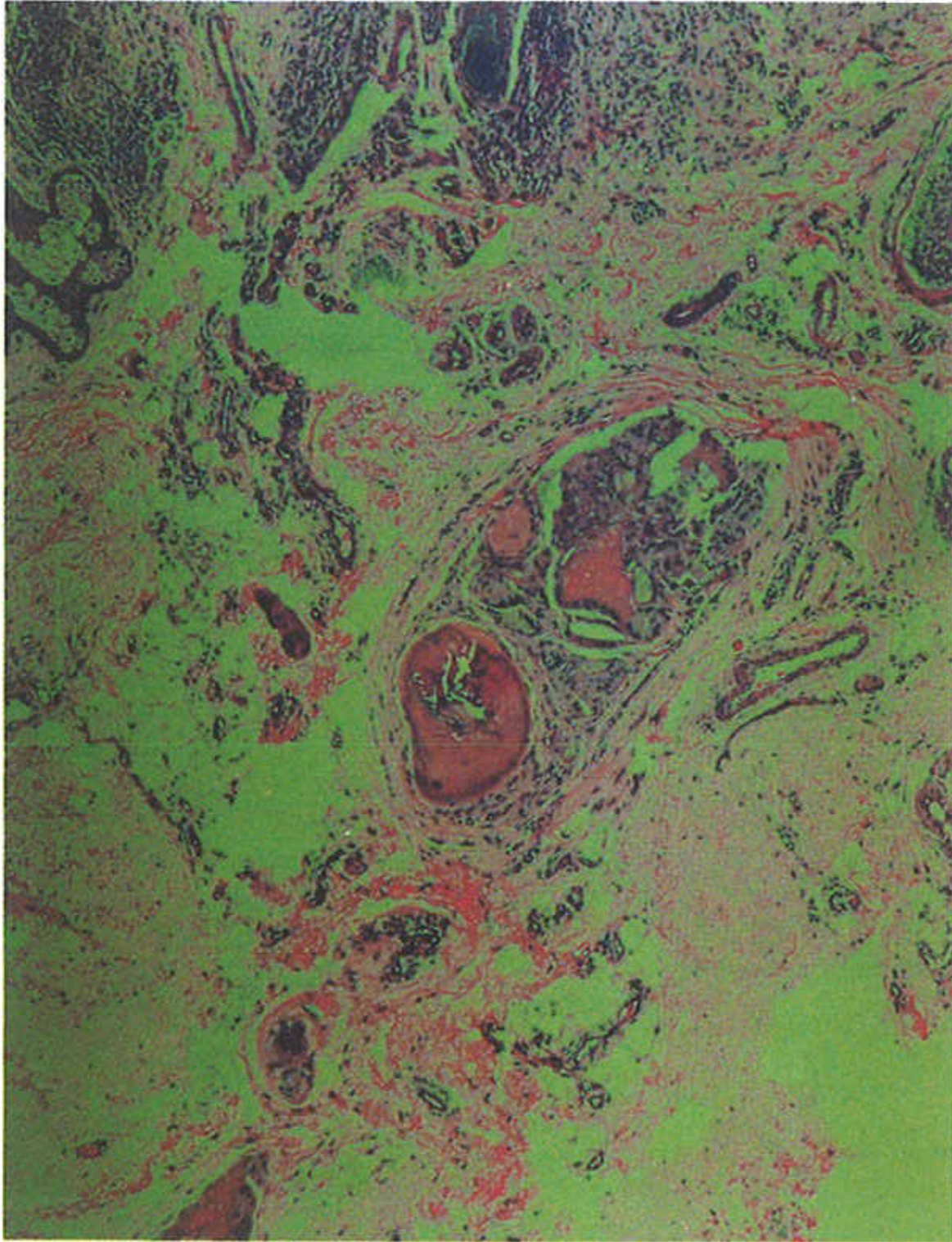
In nevi without ossification from 545 cases, foreign body granulomatous reactions to ruptured follicular cysts or hair fragments (Figs. 5,6) were seen in 16 (11 females & 5 males) located on face in all except for one on the scrotum and one on the abdomen in two men; an incidence of 3% (all sites) or 3.5% (head and neck). Hair shafts/fragments in the stroma without any granulomatous reaction were seen in two cases.

### Discussion

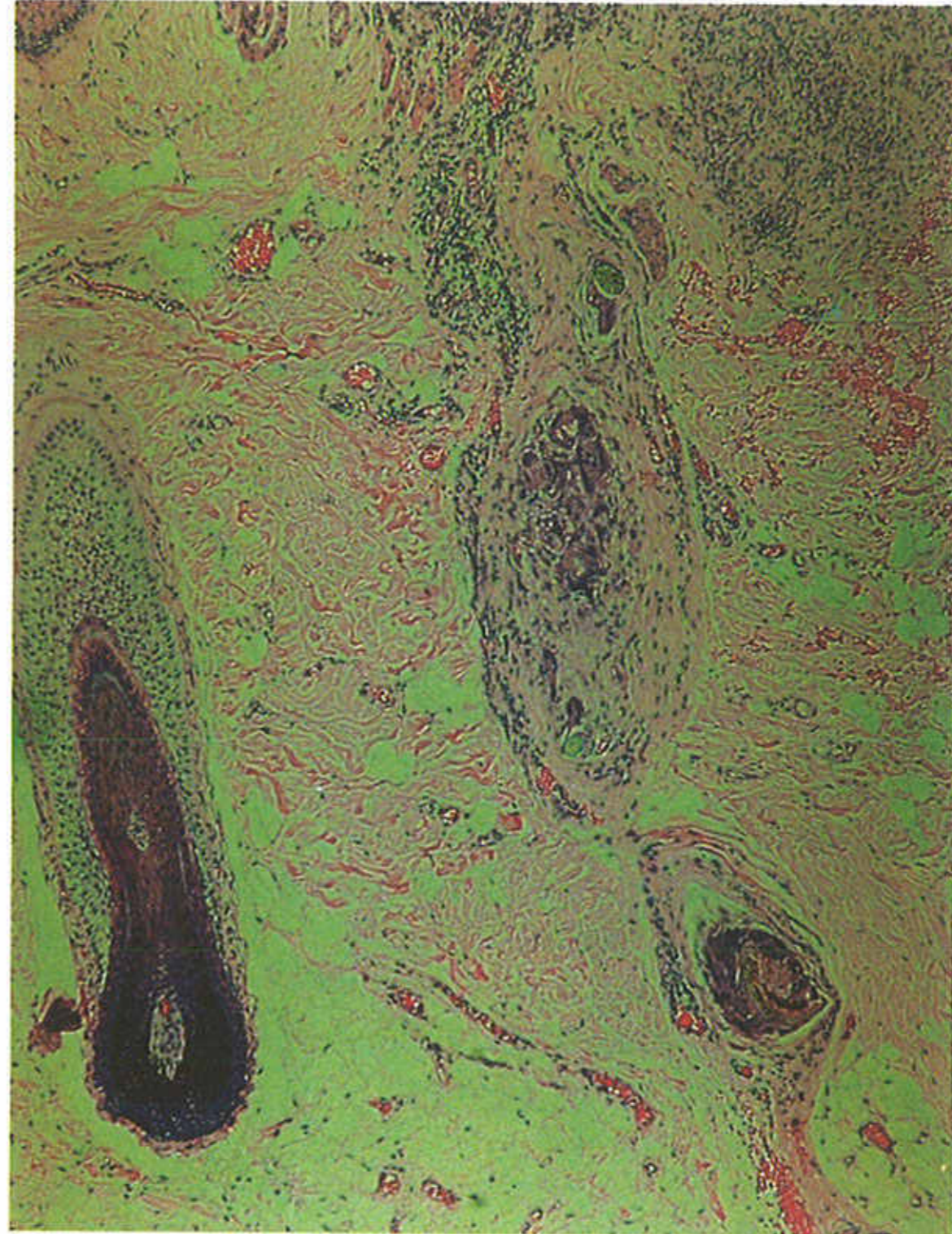
Our observation indicates that ossification in association with melanocytic nevi in our cases occurred virtually always in small congenital lesions from face and neck, predominantly of young women. All nevi showing this phenomenon were from skin regions rich in hair follicles. It is possible that coarse hairs are a hamartomatous components of the lesion. Moreover, siting of bony islands and occurrence of hair in foreign body granulomata and in bone together with topographic relationships of these to one another, all points towards a hair follicle connection suggesting that ossification occurs as a secondary phenomenon to hair follicle damage (possibly due to trauma).

While hitherto unidentified hormonal, solar





*Fig.4:Ossification and granulomatous reaction along the tract of a hair follicle in a melanocytic nevus x25.*



*Fig.5:Foreign body granulomatous reaction along the track of a hair follicle in a melanocytic nevus without ossification x25.*

or other factors predisposing melanocytic nevi on the face to ossification should not be disregarded with certainty, the fact that ossification and foreign body granulomatous reactions, alone or together, are virtually always observed in nevi of face and neck, and more frequently in younger women supports the hypothesis that it is possibly caused by trauma such as produced by plucking the hair.

Sequence of events leading to ossification in nevi can be hypothesized as damage to hair follicles resulting in foreign body granulomatous reaction and degenerative changes, leading to induction of ossification. Foreign body type granulomatous reactions adjacent to benign intradermal melanocytic nevi have been attributed to folliculitis or ruptured epidermal cyst,<sup>8,10-12</sup> to acute infection of the follicles,<sup>12</sup> or trauma resulting from plucking of coarse hairs growing from the

surface of the mole.<sup>13,14</sup> It has been proposed that pressure of nevus cells on hair follicles results in follicular distortion or obstruction and eventually cyst formation.<sup>11</sup> However, in our series, like those of Knox et al,<sup>8</sup> acute inflammation and fibrosis do not appear to be an important factor, although it is possible that infection and inflammation had occurred previously and subsided.<sup>8</sup>

In contrast to some reports,<sup>15</sup> we did not observe any cell that we could regard as having a hemopoietic function in any of the marrow spaces. It is, however, possible that ectopic bones in this situation take many more years to be colonized by hemopoietic elements.

Demodex follicularum seen in hair follicles appears to have no pathogenic significance to be considered as a stimulus for the induction of ossification, and seems to reflect the level of infestation in the population studied. The



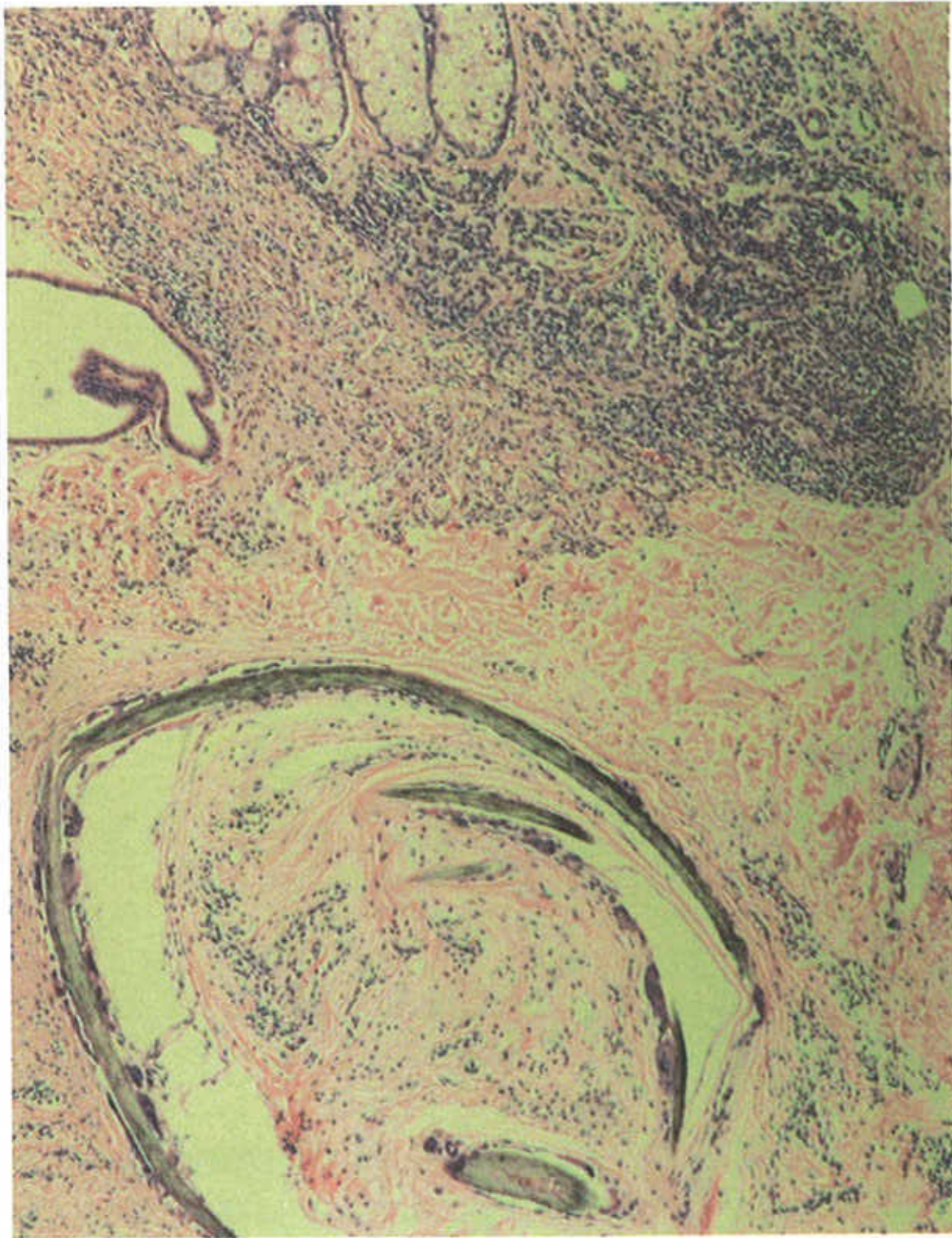


Fig.6:Coarse hair with a few foreign body granulomata in the stroma of a melanocytic nevus without ossification x50.

surprisingly high incidence of infestation in males with osteonevus (61%) compared to females (23%), and to nevi on face without ossification (21%) is difficult to explain. It is probably a fortuitous finding due to relatively small numbers of men in this group.

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### Correspondence:

Bahram Azadeh, MD, FRCPath  
 Consultant Pathologist  
 Department of Lab. Medicine & Pathology  
 Hamad General Hospital  
 P.O.Box 3050 Doha, State of Qatar.