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Hyperplastic pacinian corpuscles: an uncommonly encountered lesion of the hand

The occurrence of hyperplastic pacinian corpuscles in the hand is rare, with only 13 cases reported in the literature. We describe such a case in a 70-year-old male who had worked as a locksmith for many years. A grape-like cluster of firm, rice-sized nodules was discovered in the subcutaneous tissue of the finger following a glass-induced injury. Histopathological findings revealed pacinian corpuscles to be increased in size and number. Individual corpuscles consisted of a central nerve fiber surrounded by 35 to 60 concentric lamellae (normal controls from other specimens: 13–15 lamellae). The external corpuscular diameter ranged from 1.8 to 3.2 mm (normal controls from other specimens: 1.6 mm). Immunohistochemistry showed positive staining with Leu 7 antibody and anti-glial fibrillary acidic protein in the small nerves situated in the vicinity of the pacinian corpuscles, but not in the corpuscles themselves. The lesion reported here clearly differed from both neurofibroma with occasional pacinian differentiation and the so-called pacinian neurofibroma. There was no evidence of neurofibromatosis.

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Benign neural neoplasms and malformations are often encountered in the skin and classically include traumatic neuroma, true neuroma, neurofibroma, schwannoma, granular-cell tumor, neural nevus (1), and nerve sheath myxoma (2). By contrast, pathological conditions originating from or stimulating pacinian corpuscles are exceptional. Among those identified are the so-called pacinian neurofibroma, a lobulated tumor separated by well-defined collagen bands and composed of more or less differentiated pacinian corpuscles (3), and the hyperplasia of pacinian corpuscles, also referred to as pacinian neuroma (4, 5). We report a case of hyperplasia of the pacinian corpuscles in the finger for which an immunohistological study was performed and also review the literature pertaining to this rare condition.

Case report

A 70-yr-old, right-handed male presented with a 6-hour-old, glass-induced injury of the right third finger. The skin wound in the proximal phalanx measured 2.5 cm in length. Hemihypoesthesia of the finger corresponding to the territory of a collateral nerve was noted by the examining physician. Upon surgical evaluation, a grape-like cluster of firm, rice-grain-sized, grey nodules was found in the subcutaneous tissue which appeared to be attached to the digital nerve by a fine filament. Some nodules were removed. Evaluation of the other collateral nerve of the same finger was carried out by a second incision. The same macroscopic findings were observed (Fig. 1). The physical examination of the patient was otherwise normal. No

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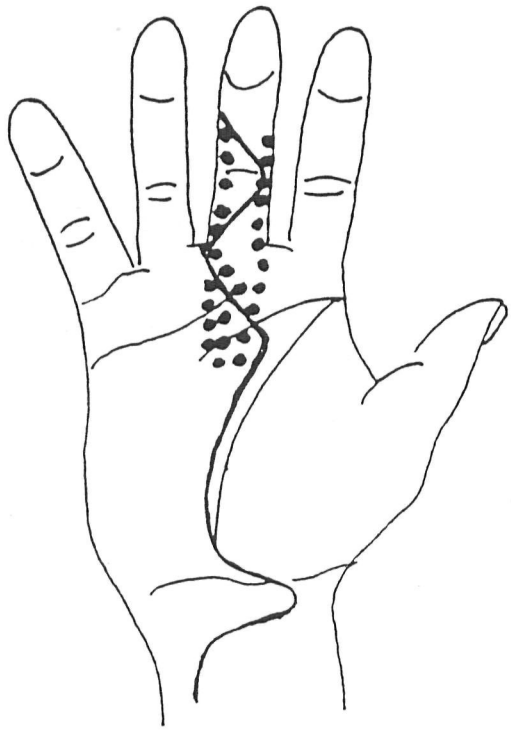

Fig. 1. Initial macroscopic appearance of pathological specimen showing numerous small rice-grain-sized nodules alongside the collateral nerves, apparently attached by a fine filament.

cutaneous tumor was found elsewhere, and there were no other neurological signs. The family history was unremarkable. Although there was no history of frank ancient trauma of the right third finger, the patient had been a locksmith for many years before retirement.

Material and methods

Light microscopic study was done on formalin-fixed, paraffin-embedded sections stained with hematoxylin-eosin. Immunohistochemistry was performed using a conventional immunoperoxidase bridge technique on formalin-fixed material. Primary antibodies to neuron-specific enolase (NSE; polyclonal, Dako, 1:100), glial fibrillary acidic protein (GFAP; polyclonal, Dako, 1:50), and NHK-1 (Leu 7; monoclonal, Dako, 1:300) were used.

Results

The biopsy specimen was a 5 × 6-mm portion of soft tissue, composed microscopically of large, mature pacinian corpuscles. Each corpuscle consisted of central nerve fiber surrounded by 35 to 50 concentric lamellae (normal controls from other adult digital cutaneous specimens: 13 to 15 lamellae) of attenuated cells which were enclosed by a capsule of collagenous connective tissue (Fig. 2). The external corpuscular diameter ranged from 1.8 to 3.2 mm (normal controls: 1.6 mm). Two or three pacinian bodies surrounded by common outer lamellae and enclosed within a single capsule were often seen (Fig. 3). Numerous small nerves were also noted around the periphery of the hyperplastic and hypertrophic pacinian corpuscles.

Staining with anti-NSE was negative. Stainings by Leu 7 and anti-GFAP displayed an intensely uniform cytoplasmic positivity localized in the small nerves situated in the vicinity of the pacinian corpuscles, but were negative in the pacinian corpuscles themselves.

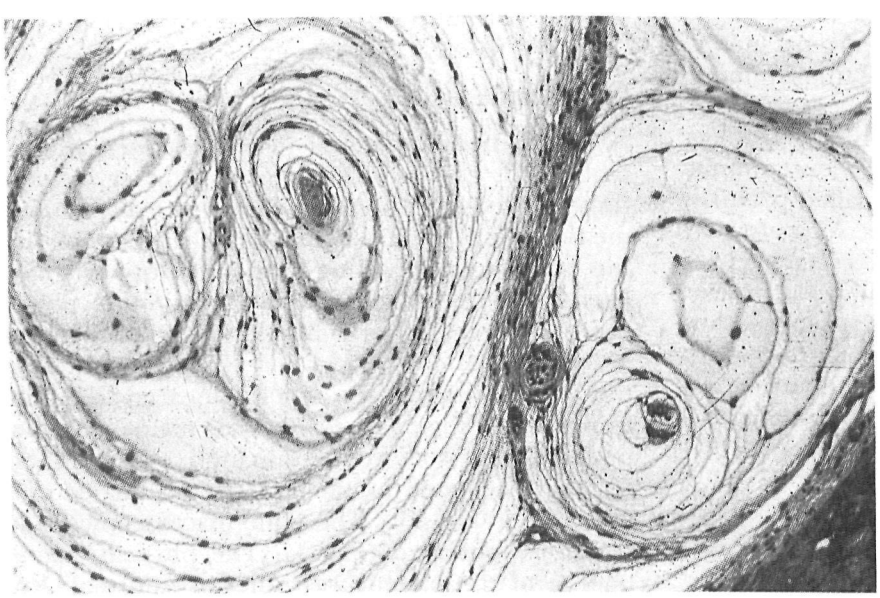

Fig. 2. Voluminous pacinian corpuscles composed of 35–50 concentric lamellae surrounding a central nerve fiber and enclosed by a capsule of collagenous connective tissue (×250).

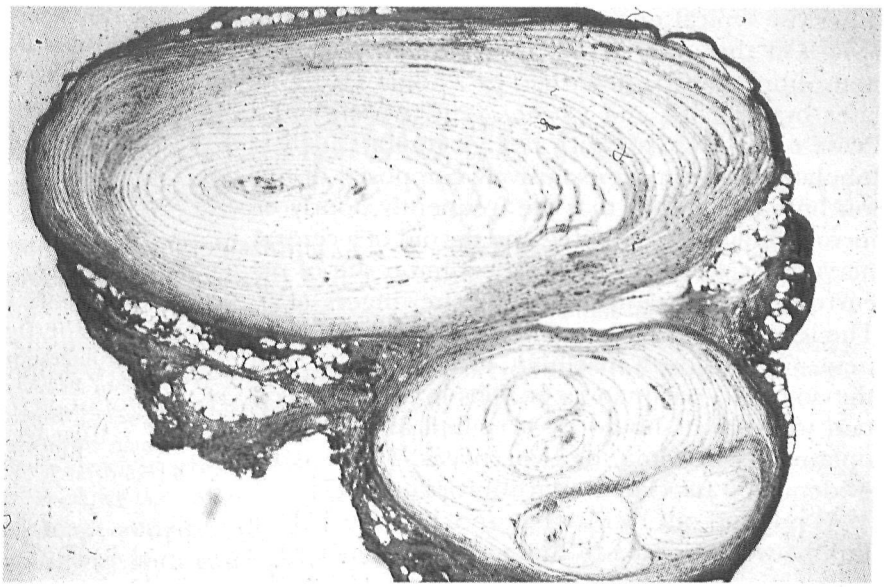

Fig. 3. Lower magnification showing overall architecture of pacinian corpuscle hyperplasia. The three Pacinian corpuscles depicted are surrounded by several common lamellae and enclosed within a single capsule (×40).

Discussion

Pacinian corpuscles represent a type of encapsulated terminal nerve apparatus that responds to pressure stimuli. They are found in the deep dermis and subcutaneous tissue of fingers and palms, where they are closely associated with glomerular arteriovenous anastomoses (4). They are also found in the conjunctiva, cornea, heart, mesentery, loose connective tissue in general, and in other organs (6).

Hyperplasia of pacinian corpuscles is rare: only 13 cases have been reported until now with regard to the hand (4,5,7–11) (Table 1). The lesion can produce pain and tenderness which may be secondary to impingement on digital nerves due to an increased volume of pacinian corpuscles in the relatively closed space of the fingers (4,5). Asymptomatic cases have also been reported (5,8). Nodular aggregates of pacinian corpuscles have also been observed in the abdominal cavity (12–14) where they may simulate tumor implants (14). Stouder and MacDonald (14) discovered such nodules at autopsy in the serosa of a gastro-jejunostomy site 2 years after a subtotal gastric resection for a chronic duodenal ulcer.

The histologic pattern is similar in all reported cases: the corpuscles have a normal structure but are increased in size and number. Sometimes they are slightly dystrophic, with several lamellar bodies enclosed within a single capsule (15). Many small nerves are associated with the pacinian corpuscles (4, 11).

Neural tumors showing structures resembling pacinian corpuscles to a greater or lesser degree have been reported (3,16–18). Though much more rarely observed than Meissner bodies, occasional mature pacinian corpuscles may be found in

Table 1. Reported cases of hyperplastic pacinian corpuscles

Author	Date	Sex	Age	Location	Symptoms		Macro	Etiol
					Tumor	Pain		
Patterson	1956	F	33	pulp of both thumbs	–	+	–	?
Zweig	1968	M	54	index	–	–	2 sessile	trauma
Zweig	1968	F	42	2nd "commissura"	–	+	1 sessile	trauma
Hart	1969	F	66	index	–	+	–	?
Sandzen	1974	F	49	IV-V	+	+	group	contusion
Sandzen	1974	M	21	base medius	+	+	group	?
Rhode	1975	M	44	II-III	+	+	group	contusion
Schuller	1978	F	47	pulp of index	–	+	–	?
Schuller	1978	M	55	V	–	+	group	contusion
Chavoin	1980	M	51	pulp of medius	–	+	group	trauma
Fletcher	1989	F	33	pulp of both thumbs	+	+	–	?
Fletcher	1989	F	44	right index	+	+	–	trauma
Fletcher	1989	F	54	IV +	+	–	–	trauma

Macro, macroscopic findings; Etio, etiology.

otherwise typical neurofibroma (3) or blue nevus (17). On the other hand, the so-called pacinian neurofibroma, first described by Thoma (19) and later by Prichard and Cluster (20) as well as by Prose et al. (21), is a rare benign tumor which is lobulated and almost exclusively composed of onion bulb formations that are frequently poorly or incompletely differentiated and devoid of a central nerve fiber (1, 17). The most common site of occurrence is the hand, including the fingers (17). The lesion reported here clearly differs from both neurofibroma with pacinian differentiation and the so-called pacinian neurofibroma. It is uncertain whether it should be classified as a true neoplasm, hamartoma, or hyperplasia. There is no evidence of associated neurofibromatosis (7).

As pointed out by Fletcher and Theaker (11), a link between trauma to the hand and hyperplasia of pacinian corpuscles can be documented in the majority of cases. Aside from our case report, 8 patients described in the literature had a definite history of antecedent trauma, whereas 5 others did not (7). It is noteworthy that the occupation of our patient, i.e., locksmith, exposed him to repeated digital microtraumas.

Hyperplastic pacinian corpuscles, although not mentioned in current dermatological handbooks, should be considered in the differential diagnosis of painful lesions of the hand. In our opinion, it should also be included, along with pacinian neurofibroma, in the list of the benign neural neoplasms and malformations arising in the skin.

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