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Pacinian corpuscle tumor

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Abstract
The authors discuss an interesting case of a Pacinian corpuscle neuroma in the finger of a young woman who presented with severe digital pain. The pain was initially attributed to pus collection in the interphalangeal joint of the thumb. The clinical signs were very subtle. The patient had complete pain relief following excision of the tumor. Pacinian corpuscle neuromas are rare, with only about few cases reported in the literature. The histology, presenting features and associated conditions are discussed in detail. In addition to a neuroma or glomus tumor, Pacinian corpuscle hyperplasia should be considered in the differential diagnosis of digital or palmar pain of unknown etiology.

Keywords: Pacinian cell neuroma, Pacinian corpuscle neuroma, Painful hand lesions

1. Introduction
Pacinian corpuscles are mechanoreceptors found in human and other animals. They are distributed in the dermis from the fingers and palm of the hand, the conjunctiva, near joints, in the mesenteries, branching blood vessels, penis, urethra, clitoris, parietal peritoneum and loose connective tissue.

The Pacinian corpuscle is a pressure receptor that responds to high-frequency vibratory stimuli. The corpuscle is fluid-filled and essentially incompressible. It consists of a single nerve fiber, the terminal region of which is enclosed in a multilaminated connective tissue capsule. The nerve is myelinated except for the terminal region within the capsule, which is nonmyelinated. The corpuscle transmits mechanical stimuli through the connective tissue lamellae and fluid, exciting the nonmyelinated receptor axon in its core (Figures 1, 2 and 3).

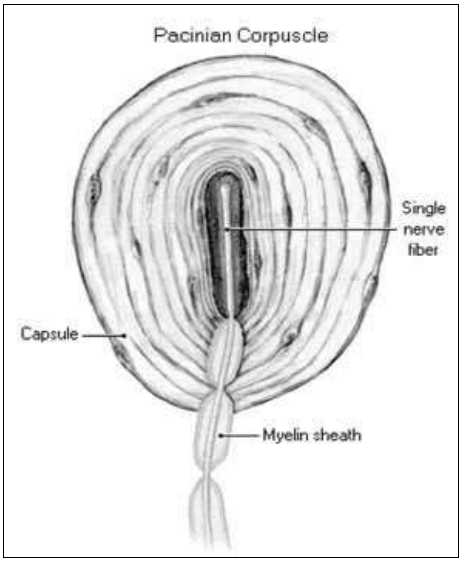


Fig 1

Schematic diagram of the microscopic structure of a Pacinian corpuscle showing a single unmyelinated nerve fiber surrounded by connective tissue lamellae. The part of the nerve outside the capsule is myelinated

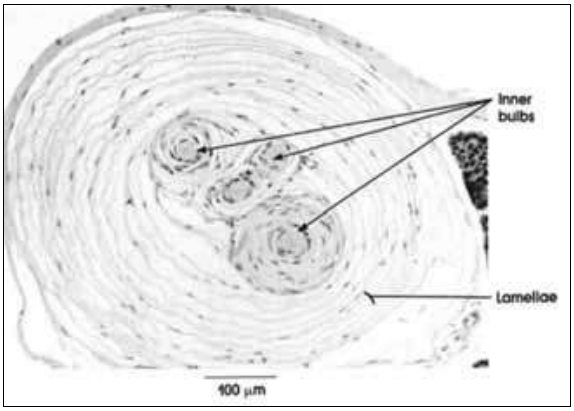


Fig 2

Microscopic structure of a normal Pacinian corpuscle showing the inner bulb (transverse section of branches of terminal unmyelinated nerve endings) and lamellae (concentric layers of collagenous connective tissue and flattened fibroblasts)

Fig 3

Low-power view of Pacinian corpuscle neuroma showing increase in size and number of Pacinian corpuscles

These end-organs are the only sensory receptors that are large enough to be identified and dissected in the anatomy laboratory. They should be looked for when dissecting the palm of the hand and fingers.

There are approximately 300 Pacinian corpuscles in the hand. They are distributed in fingers (60%), near the metacarpophalangeal joints (25% to 48%) and in the thenar and hypothenar regions (8% to 18%) [1]. A neuroma may sometimes arise from this Pacinian corpuscle. We present an interesting case of a woman with Pacinian corpuscle neuroma of the thumb.

Case presentation

35 year old female patient presented with small swelling over left index finger, gradually increasing in size over period of 5-6 months. Repetitive history of trauma was present as patient was housewife by profession. Swelling developed after nail injury where in the adjoining skin was pulled out. The swelling was painful to touch and was treated as acute paronychia with regular antibiotics and analgesics. On examination swelling was approximately 2x2 cm in size; tender to touch such that patient felt pain throughout the hand. The pain and swelling was not relieved after 10 days of treatment. Patient was repeatedly followed up by different physician until it came to us for infectious diseases consult. The treating physician and surgeon decided for incision and drainage wherein no pus was drained. Later, entire tissue was sent for histopathology after biopsy removal. The biopsy turned out to be positive for Pacinian corpuscle tumor (figure 1-6). The case reflects the repeated misuse of antibiotic and classic clinical presentation of the tumor which is associated with severe pain not relived with analgesics. Our patient had a clear history of repetitive trauma; therefore, this case strongly supports that hypothesis. Rhode and Jennings described 4 types of Pacinian neuroma histologically, which are as follows: [1] a single enlarged Pacinian corpuscle, [2]a grape-like structure of normalized Pacinian corpuscles, [3] slightly enlarged Pacinian corpuscles arranged in tandem, and [4] hyperplastic Pacinian corpuscles arranged along the entire length of the digital nerve.

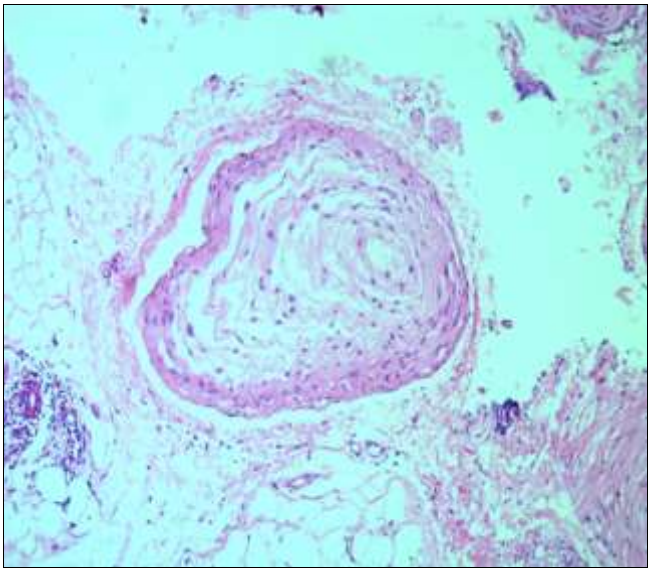


Fig 4

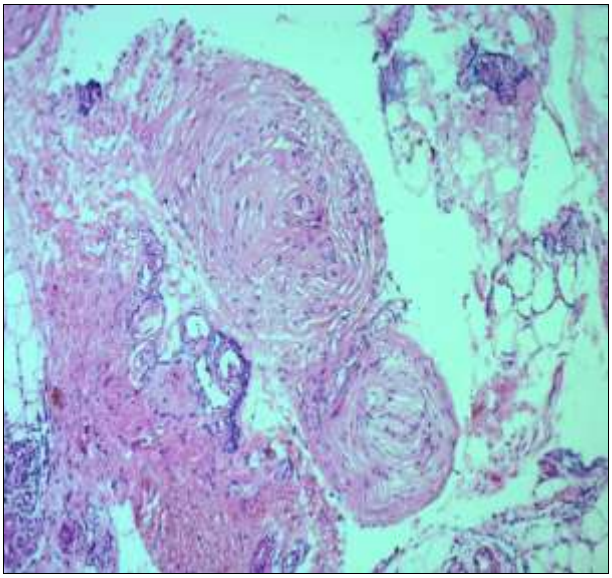
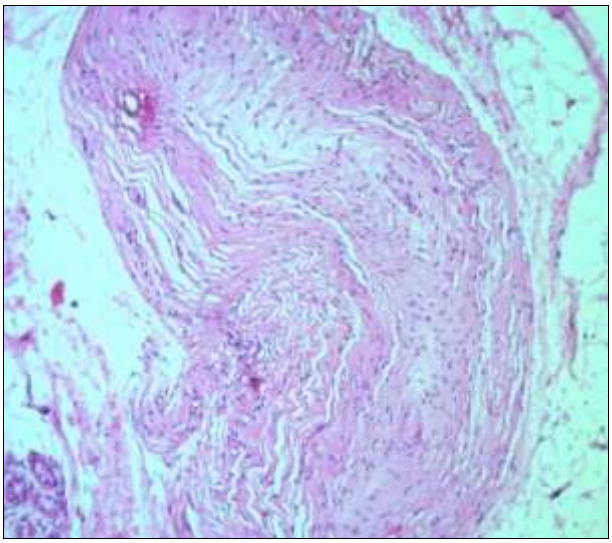


Fig 5



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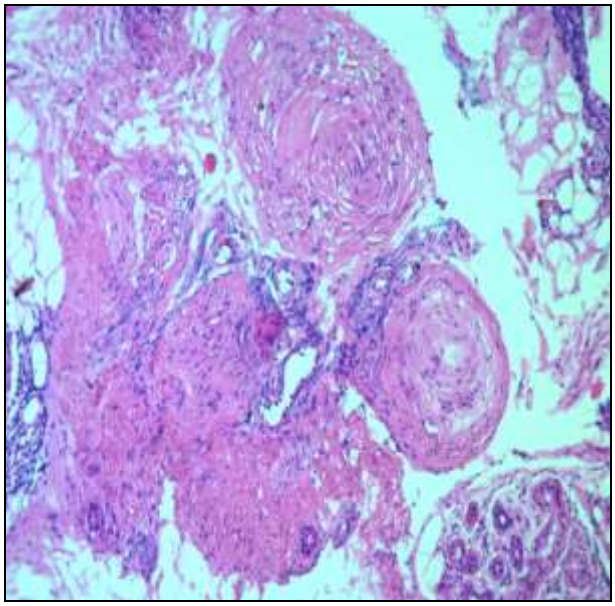

Fig 7

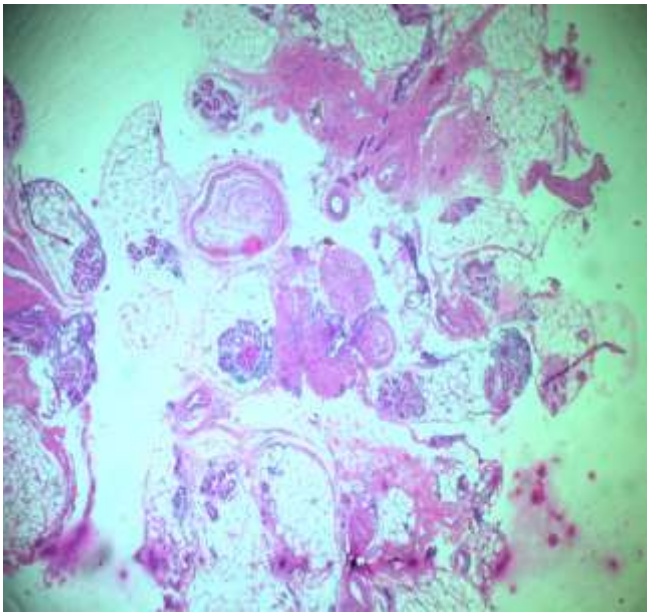

Fig 8

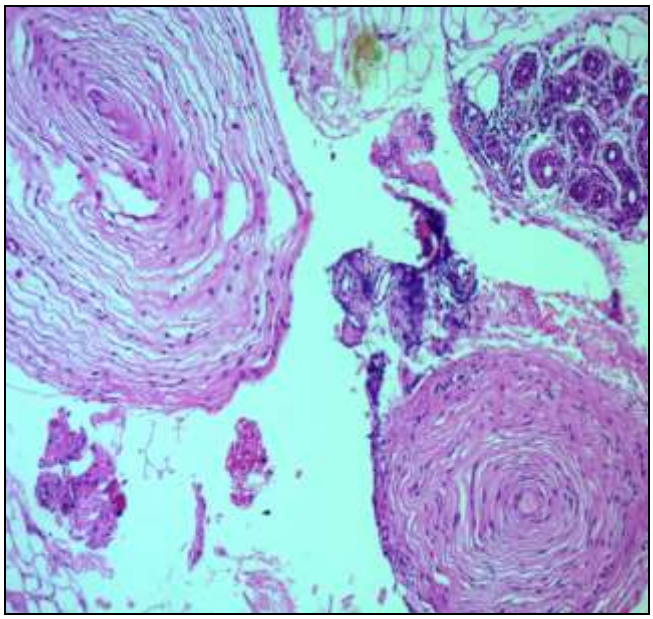

Fig 9

Differential Diagnosis

The lesions that present with pain in the hand include osteoarthritis, osteoid osteoma, synovioma, schwannoma, Acute Paronychia and traumatic aneurysm. Among these lesions, glomus tumor and schwannoma elicit point tenderness.

Discussion

Pacinian corpuscle neuroma is an uncommon lesion with a limited number of cases reported. This lesion can be called variably as Pacinian corpuscle hyperplasia or Pacinian corpuscle neuroma [2, 7].

The most common site of this lesion is the hand, where it presents as painful swelling. A prior history of trauma may be elicited in a majority of the patients and it may be associated with foreign body reaction [8]. All of the patients experienced complete pain relief following excision of the tumor.

Similar lesions have been described in other parts of the body as well. They include Pacinian neuroma of vulva, Pacinian hyperplasia of foot, sacrococcygeal pacinioma and intraperitoneal pacinian neuroma [9, 13].

Pacinian corpuscle neuromas may be associated with other lesions such as glomus tumor, Dupuytren's contracture, multiple Pacinian neuroma and arteriovenous anastomoses [14, 16].

Conclusions

The terminology used may be confusing because Pacinian cell hyperplasia and neuroma are used interchangeably. All of the reported cases were benign. There is complete pain relief following excision of the tumor. Eliciting point tenderness and an early exploration in suspicious hand swelling with sparse clinical signs help in the diagnosis and treatment of this extremely uncommon condition.

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