**Quiz Case**

**A subcutaneous firm nodule on scrotal skin: Cytological considerations**

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Received: 22 June 2021
Accepted: 19 August 2021
Published: 16 July 2022

**DOI**
10.25259/Cytojournal_27_2021

**Quick Response Code:**

A 30-year-old patient presented with a solitary painless subcutaneous 3 × 3 cm nodule in the ventral aspect of the scrotum [Figure 1a] since 2 years without prior history of sexually transmitted disease, trauma, or inflammation of the scrotum. Fine-needle aspiration of the nodule showed an amorphous debris. The smears stained with May-Grunwald Giemsa and Papanicolaou stain showed findings shown in Figure 1b and c.

**Figure 1:** Solitary subcutaneous nodule (a) Cytology smear showed amorphous debris (b: May-Grunwald Giemsa, ×400); c: Papanicolaou, ×400; d: Zoomed area from c).

**Q1. What is the most likely diagnosis?**
A. Calcified epidermal cyst
B. Necrotic debris
C. Scrotal calcinosis
D. Scrotal pilomatrixoma.
Answer:

Q1-C. Scrotal calcinosis.

The presence of the amorphous basophilic substance, that is, calcific deposits without any epithelial cells in fine-needle aspiration (FNAC) smears, favored diagnosis of calcinosis. The lack of epithelial cells in the FNAC smears helped in ruling out the possibility of a calcified epidermal cyst. The calcified debris is also reported in pilomatrixoma. FNAC of pilomatrixoma may show the presence of anucleated squames and basaloid cells, which were absent in the present case. A possibility of necrotic debris was ruled due to the lack of inflammatory background.

Q2: Which one generally is not considered as the cytological features of scrotal calcinosis?
A. Amorphous basophilic granular material
B. Presence of foreign body giant cells
C. Lymphocytes surrounding basophilic amorphous material
D. Presence of numerous epithelial cells.

The FNAC of scrotal calcinosis generally shows the presence of amorphous basophilic granular material. This material may be surrounded by lymphocytes and foreign body giant cells. The epithelial cells are usually absent in the cytological smears of scrotal calcinosis.

Q3. Which special stain is used to demonstrate calcium?
A. Periodic acid–Schiff (PAS)
B. von Kossa
C. Perl’s Prussian blue
D. Rhodanine stain.

Calcium tissue deposits can be identified by the presence of von Kossa-positive black masses. With the hematoxylin and eosin stain, calcium appears deep blue purple. PAS is a commonly used stain to detect polysaccharides such as glycogen and mucosubstances, which appears deep red (magenta). Perl’s Prussian blue stain is used to demonstrate iron deposits in tissues. Copper deposits are demonstrated by rhodanine stain, which gives a red to orange-red cytoplasmic granular positivity to elemental copper.

A definitive diagnosis of scrotal calcinosis can be made only on the basis of histology. In the present case, the subcutaneous nodule was excised, and histopathological examination showed lobules of amorphous calcified areas in the dermis. The lobules were surrounded by fibrosis; however, no surrounding foreign body reaction was observed. The calcium deposits may be surrounded by lymphocytes and foreign body giant cell reactions. In some reports, foreign body reaction surrounding the calcific deposits was not seen.

Q4: Which of the following is not implicated in the pathogenesis of scrotal calcinosis?
A. Dystrophic calcification of scrotal epithelial cyst
B. Degeneration of the dartos muscle

The pathogenesis of scrotal calcinosis is still unknown. Various authors have put forth various hypotheses. The prominent among them is that scrotal calcinosis arises due to dystrophic calcification of the ruptured scrotal epithelial cysts. Authors have argued that there is some quality to the scrotal skin that leads to rapid resolution of epidermoid cysts with calcification. Another hypothesis proposes that scrotal calcinosis is a degenerative phenomenon involving the scrotal dartos muscle, leading to calcium deposit. The argument favoring the scrotal calcinosis idiopathic nature is that the basophilic calcified material within the dermis may or may not show foreign body granulomatous reaction, and none show evidence of epithelial lining. Metastatic calcification occurs secondary to metabolic derangements such as hypercalcemia or hyperphosphatemia. In the present case, they were normal.

There was no foreign body giant reaction around the calcific deposits or epithelial lining with normal levels of serum calcium, phosphorus, and parathormone in the present case. These findings favored an idiopathic etiopathogenesis in the present case suggesting a diagnosis of idiopathic scrotal calcinosis (ISC).

**BRIEF REVIEW OF THE TOPIC**

ISC is rare and has a benign course. This condition of uncertain cause typically begins in adolescence or early adulthood and occurs in the absence of abnormalities in calcium and phosphate metabolism. It is characterized by slow-growing subcutaneous nodules. The nodules...
vary in number and can be solitary or grouped. The color of the nodule may vary from yellowish-white to no color change depending on the age of the nodule. These lesions are usually firm and asymptomatic, although itching, pain, and episodes of infection may occur. ISC may be complicated with itching, heaviness, or chalky material discharge.

Pathogenesis still remains unknown and continues to be debated. The dystrophic calcification of scrotal epithelial cysts and degenerative changes of dartos muscles leading to change in the microenvironment causing deposition of calcium and phosphate are the suggested pathophysiological modes for the development of ISC.

Clinical differential diagnosis includes other scrotal lesions such as calcified epidermal inclusion cyst, pilomatrixoma, steatocystoma, calcified parasitic cyst, ancient schwannoma, lipoma, fibroma, and cutaneous horn. Cytologically calcified epidermal cyst is differentiated from ISC by the presence of epithelial cells in the epidermal cyst. Pilomatrixoma is cytologically characterized by the presence of basaloid cells, calcium deposits, naked nuclei, shadow (“ghost”) cells, giant cells, and inflammatory background. Steatocystoma shows acellular, granular debris, rare cholesterol crystals, and anucleate squames. Ancient schwannoma, which shows secondary changes including calcification, is usually hypocellular consisting of clusters of spindle cells with elongated nuclei. In the case of a calcified parasitic cyst, parts of parasitic remnants in smears usually provide the clue. However, diagnosis is usually confirmed on histopathological features.

The role of FNAC in the diagnosis of ISC remains limited; however, it can be a helpful as a preliminary diagnostic tool for this rare disorder. A diagnosis by FNAC may be comforting for both the treating surgeon and the patient. Surgical excision is the treatment of choice; however, cosmetic disfigurement is the major limitation of the surgical excision.

Answers to Q2 through Q4:
Q2-D. Presence of numerous epithelial cells.
Q3-B. von Kossa.
Q4-C. Metastatic calcification secondary to metabolic derangement.

SUMMARY
We have described an uncommon case of ISC in scrotal skin that can be reliably diagnosed on FNAC. ISC occurs in the absence of any calcium and phosphate metabolism abnormalities; however, the pathogenesis remains elusive. Therefore, surgical excision is the treatment of choice.

COMPETING INTEREST STATEMENT BY ALL AUTHORS
The authors declare that they have no competing interest.

AUTHORSHIP STATEMENT BY ALL AUTHORS
Each author has participated sufficiently in the work and takes public responsibility for appropriate portions of the content of this article. All authors read and approved the final manuscript. Each author acknowledges that the final version was read and approved.

ETHICS STATEMENT BY ALL AUTHORS
The informed and written consent was obtained from the patient. This case is submitted without identifiers.

LIST OF ABBREVIATIONS (In alphabetic order)
FNAC – Fine-needle aspiration cytology
ISC – Idiopathic scrotal calcinosis
MGG – May-Grunwald Giemsa.

EDITORIAL/PEER-REVIEW STATEMENT
To ensure the integrity and highest quality of CytoJournal publications, the review process of this manuscript was conducted under a double-blind model (authors are blinded for reviewers and vice versa) through automatic online system.

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