



Injury-Induced Epidermal Cyst Located On the Finger - A Rare Case Report

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Abstract

Background: Examination of the tissue reveals a dermoid cyst characterized by a clearly outlined wall covered with layered squamous epithelium. The hollow space within the cyst might house fully formed adnexal structures originating from mesodermal sources, such as hair follicles, shafts, sebaceous glands, and eccrine glands. Soft tissue tumors frequently occur in the hand and can stem from different tissues within the hand. Typically, they manifest as painless surface swellings, posing minimal risk to nerves, vessels, or tendons. Dermoid cysts stem from irregularities in fetal development, arising from the anomalous entrapment and incorporation of surface ectoderm during embryonic skin fusion. Typically located along cranial sutures or the anterior fontanelle, these cysts can manifest elsewhere. We present a case involving a dermoid cyst implanted on the index finger's right hand, leading to tingling sensations. Successful surgical removal, ensuring the protection of the neurovascular bundle, was performed, resulting in a smooth recovery. A 55-year-old male farmer presented with a year-long swelling on his right index finger, stemming from a fieldwork injury. The enlarging swelling caused pain, limited finger movement, and tingling sensations. Thorough examinations revealed a dermoid cyst, confirmed by ultrasound. With no prior medical issues, surgery was advised for excision under local anesthesia. The patient maintained normal vital signs and blood tests. This case highlights the rare occurrence of a dermoid cyst on the finger, likely induced by occupational trauma, requiring surgical intervention for symptom relief and restoration of hand function.

Conclusion: The case illustrates a rare dermoid cyst on the index finger, stemming from occupational trauma. Successful surgical excision led to symptom relief. Dermoid cysts, typically from fetal development irregularities, rarely manifest on fingers. This highlights the need for meticulous diagnosis and treatment for hand cysts, especially in occupational settings.



Introduction

This case report describes the occurrence of an epidermal cyst on the finger, which is considered rare due to several factors: Uncommon Location: Epidermal cysts are more commonly found in areas with hair follicles, such as the scalp, neck, or back. Finding one on the finger, a hairless region, is relatively rare. Typically, epidermal cysts occur in areas where the skin has hair, such as the scalp, face, neck, or trunk. As it Trauma-Induced: While epidermal cysts can develop spontaneously, they often arise from trauma or injury to the skin. In this case, the cyst developed as a result of a fieldwork injury, which is not a typical scenario for the development of such cysts. The patient in this case was a farmer, and epidermal cysts are more commonly associated with occupations involving repetitive minor injuries to the hands, such as farming, factory work, carpentry, or tailoring. However, even within these occupations, finger involvement is not as common as in other parts of the body. Epidermal cysts on the finger may pose diagnostic challenges due to their atypical location and presentation. They may not be promptly identified or diagnosed, especially if they manifest differently from typical epidermal cysts. While surgical intervention is usually unnecessary for asymptomatic cysts, in cases where the cyst causes symptoms or interferes with hand function, surgical treatment becomes necessary. Surgical removal of cysts on the finger requires meticulous excision to ensure complete removal and prevent recurrence, which may pose challenges due to the finger's intricate anatomy and function.

Case presentation

A 55-year-old male farmer sought hospital care due to a year-long swelling on his right index finger, a result of a fieldwork injury. The swelling, progressively enlarging, caused pain during finger movement and gripping objects. Additionally, intermittent tingling sensations afflicted the right index finger. These symptoms suggested a persistent issue stemming from the occupational injury. The patient's history as a farmer and the gradual nature of the swelling indicated a chronic condition, requiring thorough examination and a holistic approach to address both the physical discomfort and potential nerve involvement in the right hand. The individual has a clean medical re-

cord, devoid of any prior health issues or co morbidities. There is no known History of Hypertension (HTN), Diabetes Mellitus (DM), thyroid disorders, or cardiac diseases in this patient and no surgical intervention was done previously. The individual underwent thorough examinations, encompassing a full blood count and routine blood tests, all of which exhibited results within the normal range during the hospital stay. The patient maintained proper orientation, consciousness, and a normal body temperature without fever, along with a blood pressure of 130/80 mmHg and a pulse rate of 78 beats per minute. Local examination are soft, painless mass is felt in certain areas, with normal overlying skin. The diagnosis of a dermoid cyst is often confirmed with USG findings i.e seen in Figure 1.1. right index finger middle phalanx aspect well circumscribed, hypo to anechoic mass lesion seen in size - 1.64cm* 0.73cm* 1.49cm, mass lesion has no vascularity with E/O wall calcification S/O Epidermoid Cyst. Patient was advised for surgery procedure and planned for excision of dermoid cyst under local anesthesia.

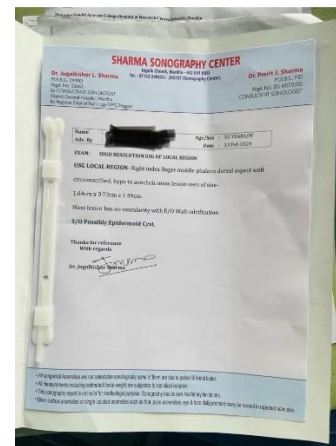


Figure 1.1: USG Report.

Under AAP under ring block and local anesthesia cleaning and draping done, linear incision of 2 cm taken and incision were deepened, layers wise separation done. Excision of dermoid cyst done, hemostasis achieved, dressing done. Procedure was uneventful and with no complication. Steps wise procedure seen in Figure 1.2 to Figure 1.9.

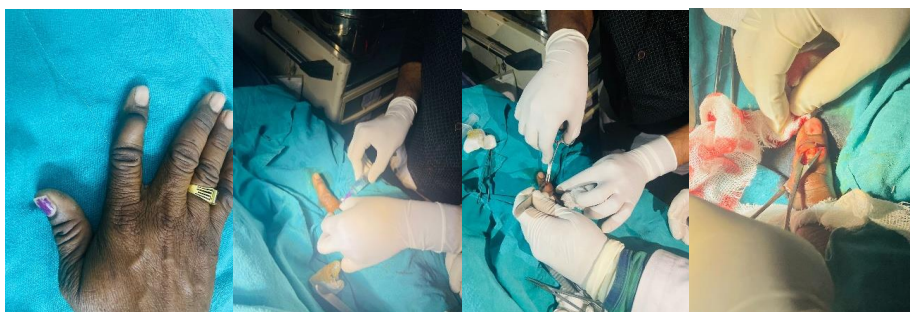


Figure 1.2: Step 1 Figure 1.3: Step 2 Figure 1.4: Step 3 Figure 1.5: Step 4

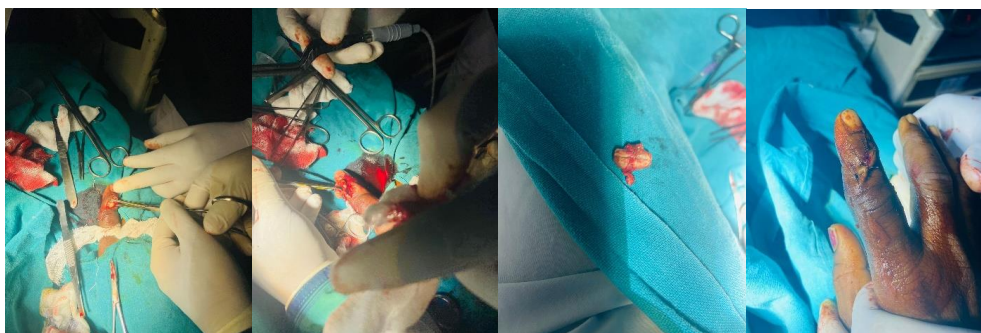


Figure 1.6: Step 5 Figure 1.7: Step 6 Figure 1.8: Step 7 Figure 1.9: Step 8

Following the surgery, the patient received a course of antibiotics, pain relievers, and antacids for a duration of five days. Throughout this period, the patient remained in a stable condition.

Discussion

A dermoid cyst is a benign skin anomaly that develops when ectodermal components become trapped along the closure lines during embryonic development [1,2]. These benign growths are enveloped by stratified squamous epithelium and feature fully formed skin appendages on their surfaces. Their interiors are filled with keratin and hair [3]. Although dermoid cysts typically originate at birth, not all of them are promptly identified or diagnosed during the neonatal period [3-5]. Approximately 40% of dermoid cysts are recognized at the time of birth, with the remaining 60% being diagnosed by the age of five [3]. Dermoid cysts typically manifest during the initial year of life and exhibit gradual growth over time [1]. Most dermoid cysts, precisely 84%, are typically located in the head and neck area [4]. Genuine epidermoid inclusion cysts result from the inclusion of epidermal elements into the dermal layer, often occurring as a result of different injuries or surgical procedures. Theoretically, any break in the skin, be it a puncture, cut, or incision, can introduce epidermal components into the dermal and subcutaneous layers. The persistent presence of these elements triggers the formation of a cyst with a sturdy wall, housing a white, cheesy material consisting of keratin and other epidermal substances [6].

These cysts are commonly observed in individuals engaged in occupations such as farming, factory work, carpentry, and tailoring, where the hands are subjected to repetitive minor injuries [7]. Infrequently, these cysts may appear in the aftermath of surgical incisions and various hand-related surgical interventions. Factors such as HPV infection, exposure to ultraviolet light, and blockage of eccrine ducts are also proposed as additional contributors to the formation of epidermoid cysts on the palms and soles [8-10].

Dermoid cysts originate from deviations in fetal development, arising from the unusual entrapment and incorporation of surface ectoderm along the lines where the skin fuses during embryonic development. This anomaly often leads to the presence of dermoid cysts along cranial sutures or the anterior fontanelle [2,4]. Given that epidermoid inclusion cysts frequently localize to specific sites, a diagnosis can often be confidently established through a thorough examination of the patient's history of related trauma and a basic clinical assessment.

While not offering a conclusive diagnosis, imaging studies are recommended for a thorough assessment. Typically, X-rays are the initial examination requested. Ultrasonography might be occasionally helpful, and computed tomography along with magnetic resonance imaging are valuable for understanding the anatomy of soft tissue tumors, although rarely essential for guiding treatment. Fine Needle Aspiration Cytology (FNAC) can assist in cytological diagnosis, particularly if adequate keratin or sebaceous material is obtained. Histologically, inclusion epidermoid cysts display a lining of layered squamous epithelium with a granular cell layer, filled with eosinophilic lamellated keratinous material. Inflammatory responses may vary, and longstanding cysts may exhibit calcification. It's crucial to differentiate epidermoid inclusion cysts in the hand from ganglions, giant cell tumors of the tendon sheath, lipomas, and swellings related to bones or joints. Since most hand dermoid cysts are

benign and often symptom-free, surgical intervention is usually unnecessary. However, for symptomatic cysts that disrupt hand function, surgical treatment becomes essential. This procedure requires meticulous and thorough excision, easily accomplished under regional anesthesia with a pneumatic tourniquet, ensuring the complete removal of the cyst wall to prevent recurrence [11].

In the current situation, the removal of the dermoid cyst was deemed necessary due to its impeding effect on finger and hand movements. The patient experienced symptoms associated with the swelling, significantly impacting his daily activities and necessities.

Conclusion

Epidermoid cysts are commonly seen, yet their occurrence in hairless regions remains infrequent, with an unclear etiology. While the link between trauma, HPV, and cyst development is established, chronic loading on areas subjected to repetitive stress, such as the finger in this case, can also serve as a contributing factor. This patient's situation underscores the potential influence of sustained pressure on the finger in the genesis of epidermoid cysts, offering a nuanced perspective on their origin.

Conflict of interest: No.

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