Case Report

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Post-traumatic Dorsal Wrist Epidermal Inclusion Cyst with Retained Foreign Body Mimicking a Ganglion: A Case Report

Surgery Section

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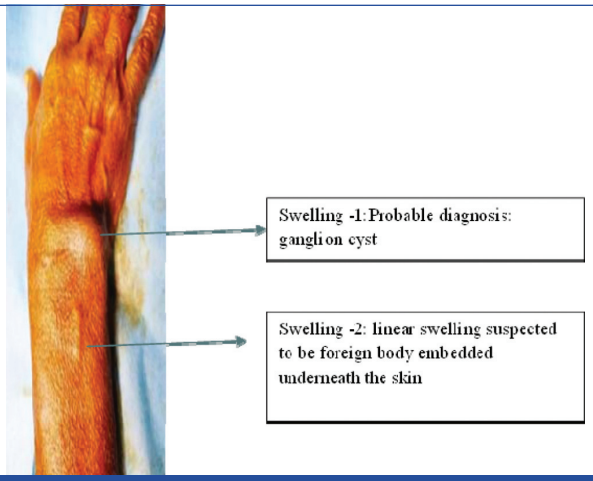
ABSTRACT

Post-traumatic epidermal inclusion cysts of the wrist are uncommon lesions that can closely mimic a dorsal wrist ganglion clinically. A 63-year-old woman presented with two painless, progressively enlarging swellings over the dorsal aspect of the left wrist for three months, associated with restriction of wrist flexion. She reported a penetrating injury four months earlier due to accidental bangle-spiral intrusion at the wrist, followed by native treatment. There were no constitutional symptoms, discharge, ulceration, or features suggestive of infection. She was a known case of type 2 diabetes mellitus for eight years on regular medication, with no other co-morbidities. Examination revealed two firm, non tender, non pulsatile dorsal wrist swellings with normal overlying skin and mobility along the tendinous plane. A clinical diagnosis of dorsal wrist ganglion with retained foreign body was considered, given the antecedent trauma. Plain radiography demonstrated two radiopaque foreign bodies closely related to the swelling. Owing to delayed presentation and patient preference, exploration was performed under local anaesthesia with intraoperative fluoroscopic (C-arm) guidance. A well-defined cystic lesion at the level of the joint space containing the foreign body and thick pultaceous material was identified. The foreign body was removed and the cyst excised en bloc, with fluoroscopic confirmation of complete removal. Histopathology established the diagnosis of an epidermal inclusion cyst. This case highlights that post-traumatic epidermal inclusion cysts with retained foreign bodies can closely mimic dorsal wrist ganglia, and underscores the importance of eliciting penetrating injury history, using appropriate imaging, and performing complete excision for definitive diagnosis and cure.

Keywords: Foreign body granuloma, Ganglion cyst, Keratinous cyst

CASE REPORT

A 63-year-old woman presented with two swellings over the dorsal aspect of her left wrist that was present for three months. The swellings were insidious in onset and gradually progressive, and were not associated with pain. She reported a history of trauma to the left wrist four months earlier, during which there had been accidental penetration by a bangle spiral at the wrist (when a sharp metallic bangle spiral pierced the dorsal wrist during household activity, following which a small external wound was noted and a retained fragment was suspected) [Table/Fig-1]. She had subsequently received native treatment (consisting of local cleansing, application of herbal paste/oil, and tight bandaging). There was no history of fever, chronic cough, joint pain, local discharge, ulceration, or constitutional symptoms. She was a known case of type 2 diabetes mellitus for eight years and had been on regular medication, with no other documented co-morbidities. There was no significant past surgical history and no relevant personal or family history.



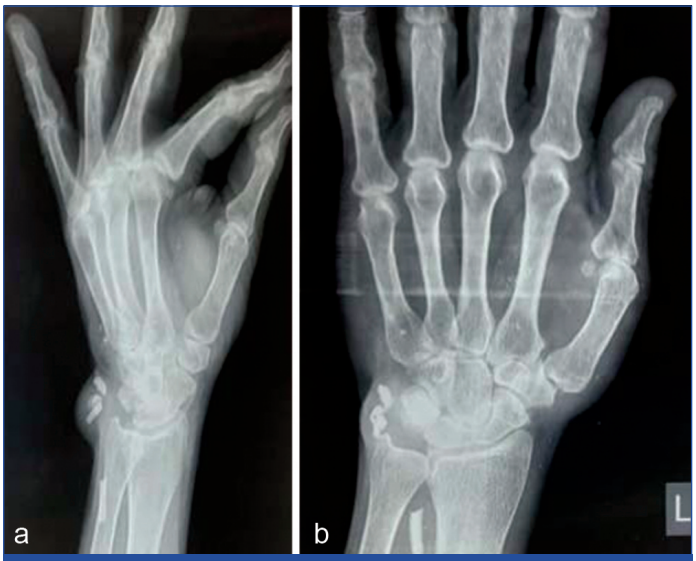
[Table/Fig-1]: Clinical picture.

On clinical examination, there were two non pulsatile swellings over the dorsal wrist. They were firm and non tender, with normal overlying skin and no local warmth or sinus. The swellings demonstrated mobility along the tendinous plane, and wrist flexion was restricted, likely due to mechanical tethering and local mass effect. Based on the clinical findings and the antecedent penetrating injury, a provisional diagnosis of a dorsal wrist ganglion with a retained foreign body in-situ was made, and the patient was referred for radiological evaluation to confirm the foreign body status and guide management. Differential diagnoses included post-traumatic epidermal inclusion cyst, foreign-body granuloma, giant cell tumour of tendon sheath, and less likely lipoma or chronic infective collection.

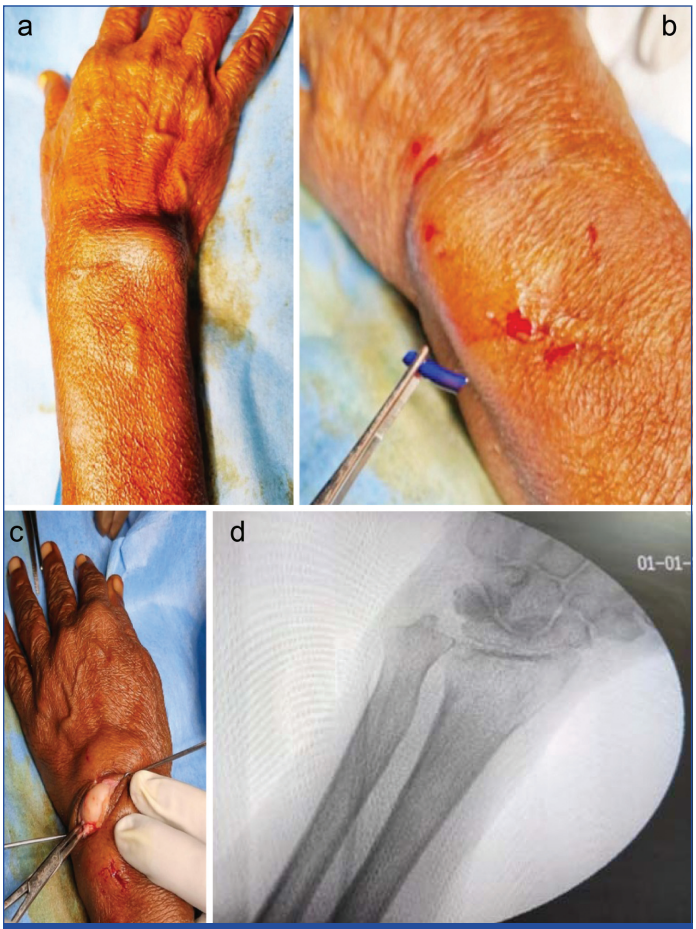
Plain radiography (X-ray) of the hand/wrist demonstrated two radiopaque foreign bodies, one within the region of the swelling, consistent with the reported bangle spiral, and suggested its close association with the cystic lesion and another not associated with the swelling [Table/Fig-2]. Given the delayed presentation, the patient's preference for definitive management, and imaging evidence of a retained foreign body, surgical exploration and excision were undertaken under local anaesthesia with intraoperative fluoroscopic (C-arm) guidance.

Exploration revealed a solitary, well-defined cystic swelling at the level of the wrist joint space with a foreign body within the lesion and associated thick, pultaceous material. The foreign body was removed, and the cyst was excised in toto. The second swelling which was a foreign body underneath the skin was also removed. Haemostasis was achieved, the wound was thoroughly irrigated, and complete removal of the foreign body was confirmed on C-arm imaging. The wound was closed and a sterile compression dressing was applied [Table/Fig-3]. The excised specimen was sent for histopathological examination, which established the diagnosis of an epidermal inclusion cyst showing a cyst wall lined by keratinising stratified squamous epithelium with a granular layer, enclosing laminated keratinous debris, with focal cyst wall rupture and

surrounding chronic inflammatory/foreign-body giant-cell reaction [Table/Fig-4]. The patient was lost to follow-up.



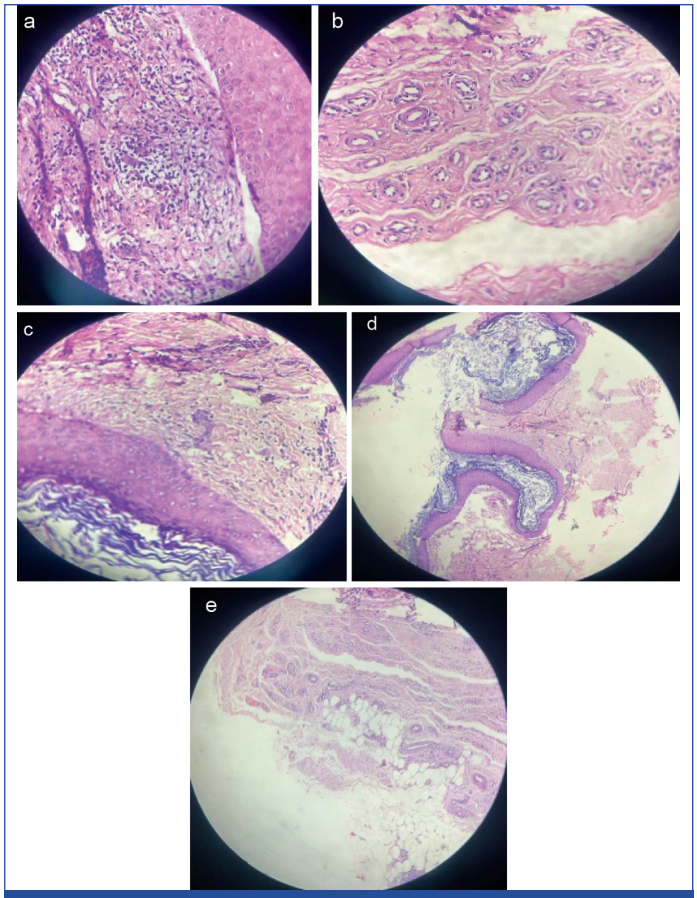
[Table/Fig-2]: Radiographic assessment: a) X-ray lateral view of wrist showing foreign body at the dorsal aspect of wrist; b) X-ray anterior posterior view of wrist showing foreign body at the distal forearm.



[Table/Fig-3]: Preoperative and intraoperative images postoperative images were not available for inclusion a) Preoperative; b) Bangle spiral removed from the wrist; c) Cyst identified during excision; d) C-Arm confirmation was done for presence of no foreign body in situ.

DISCUSSION

Dorsal wrist swellings in adults are most commonly attributable to ganglion cysts, which represent the most frequent soft-tissue mass in the hand and wrist, and 60–70% arise on the dorsal aspect [1,2]. In typical anatomy, dorsal wrist ganglia often communicate with the joint capsule via a pedicle that frequently originates near the scapholunate ligament, explaining why lesions cluster at the dorsoradial carpus and may become taut with wrist motion [3]. Although many ganglia are painless and present for cosmetic



[Table/Fig-4]: Histopathological findings (H&E, 40x); a) Keratin deposition with inflammation; b) Neo vascularisation with dense inflammation; c) Keratin deposition with in the stratified squamous epithelial cyst wall surrounded by macrophage activity; d) Ruptured cyst wall; e) Cellular debris, keratin deposits.

reasons, they can restrict motion or cause discomfort when they mechanically impinge on capsuloligamentous structures or tendons, which aligned with the index patient's flexion restriction and 'tendinous-plane' mobility [3]. However, the clinical scenario here contained two key red flags that widened the differential diagnosis beyond a simple ganglion: a preceding penetrating injury and suspicion of a retained foreign body. Retained foreign material can drive chronic inflammation and delayed mass formation, and imaging is recommended when a foreign body is suspected but not confidently identified on examination or when delayed presentation suggests occult retained fragments [4]. In the wrist/hand, relevant differentials for firm, non tender dorsal swellings include epidermal inclusion (epidermoid) cyst, giant cell tumour of tendon sheath, foreign-body granuloma, lipoma, and less commonly infective collections or neoplasms, with clinical overlap that can mimic ganglion cysts [5].

Epidermal inclusion cysts are pathologically defined by a cyst wall lined with stratified squamous epithelium (with a granular layer) and a lumen filled with laminated keratin, often described macroscopically as thick, 'pultaceous' keratinous material [6]. Importantly, 'secondary' epidermal inclusion cysts can occur following traumatic implantation of epidermal/follicular epithelium into the dermis or subcutaneous tissues, which then proliferates and produces keratin within a closed cavity [7]. Post-traumatic epidermal inclusion cysts have been reported particularly in distal extremities such as fingers, palms, and soles, supporting biological plausibility for a wrist lesion after a puncture-type injury [8,9]. In this case, the accidental penetration by a bangle spiral likely inoculated epidermal elements deep to the skin and/or introduced a retained fragment that maintained a chronic local reaction, ultimately manifesting as a slowly enlarging, painless dorsal wrist mass.

The finding of two swellings on the dorsal wrist can be interpreted through both anatomical and pathological lenses. Ganglion

cysts can be multiloculated and may present as more than one palpable component due to septations, adjacent satellite cysts, or tracking along tendon sheaths [1]. Similarly, epidermal inclusion cysts may appear as complex lesions if there are adjacent inflammatory nodules, foreign-body reaction, or separate pockets of keratinous debris, especially when a retained foreign body is present [7,10]. This finding was biologically plausible in the present context, as epidermal inclusion cysts are well-recognised post-traumatic lesions that can arise after penetrating injuries due to implantation of epidermal elements into deeper tissues; the presence of a retained foreign body can further perpetuate chronic irritation and cyst formation. The case therefore represented a post-traumatic epidermal inclusion cyst of the dorsal wrist with a retained bangle-spiral foreign body, clinically mimicking a ganglion cyst. The absence of fever, discharge, warmth, and sinus reduced the likelihood of an acute abscess, but it did not exclude a chronic foreign-body reaction or sterile inflammatory response. Radiological work-up was appropriately directed at confirming the foreign body and understanding its relationship to the mass [11]. Plain radiographs are first-line for detecting radiopaque foreign bodies (e.g., metal, many types of glass) and for confirming completeness of removal when multiple fragments are possible [12]. Radiography is less sensitive for radiolucent material (such as wood or some plastics), in which case ultrasonography becomes particularly valuable, and Tantray MD et al., highlighted ultrasound accuracy for radiolucent foreign bodies in extremities and its role in safer, targeted removal [13]. Carneiro BC et al., also emphasise that Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) may be selected when the foreign body is occult or when complications (deep infection, tendon injury, osteomyelitis, or neurovascular compromise) are suspected, because these modalities better delineate soft-tissue involvement and secondary damage [14]. In the present patient, the foreign body was radiopaque and visible on X-ray, and intraoperative fluoroscopic confirmation (C-arm) was technically sensible to localise the fragment, minimise dissection, and document complete removal.

Operative findings strongly supported the final diagnosis. The combination of a well-defined cystic lesion near the joint space, intralesional retained foreign body, and thick keratinous ('pultaceous') content is characteristic of an epidermal inclusion cyst rather than a ganglion, which typically contains gelatinous mucin and has a synovial-lined pseudocyst configuration connected to a joint or tendon sheath [1]. Complete excision 'in toto' is a key technical principle for epidermal inclusion cysts because leaving residual cyst wall increases recurrence risk, whereas removing the entire capsule and contents is associated with excellent prognosis. Lincoski CJ et al., focused on epidermoid/epidermal cysts of the hand and reported that recurrence can occur after excision, underscoring why meticulous marginal excision of the full cyst wall is emphasised in operative technique and pathology confirmation [15]. Although the prognosis of epidermal inclusion cysts is excellent after complete excision, recurrence can occur when the cyst wall is incompletely removed; hence, complete capsular excision is essential to minimise this risk [15].

The patient's diabetes mellitus status was also clinically relevant to perioperative planning and postoperative surveillance. Diabetes has been associated with increased risk of surgical site infections and wound-healing complications, through mechanisms including immune dysfunction and microvascular changes, making careful asepsis, adequate irrigation, and close follow-up particularly important in hand and wrist procedures [16,17]. Evidence from Martin ET et al., has shown diabetes to be an independent contributor to surgical site infection risk, supporting the need for optimisation of glycaemic control and heightened vigilance even after minor procedures under local anaesthesia [16]. From a diagnostic standpoint, this case illustrates how epidermal inclusion cysts can clinically mimic ganglia when they occur near joints and tendon planes, particularly when painless, firm, and slowly progressive. It also reinforces the practical principle that a history of penetrating trauma or prior instrumentation should prompt deliberate evaluation for retained foreign body and implanted epidermal elements, since delayed presentations months to years after injury are well documented in post-traumatic epidermal inclusion cysts. Finally, the intraoperative use of fluoroscopy can reduce blind exploration risks in anatomically crowded regions like the dorsal wrist where extensor tendons, superficial sensory nerves, and capsuloligamentous structures are in close proximity.

CONCLUSION(S)

This case highlighted an uncommon presentation of a post-traumatic epidermal inclusion cyst of the dorsal wrist containing a retained bangle-spiral foreign body, clinically mimicking a ganglion cyst. A careful history of penetrating injury, appropriate radiographic evaluation demonstrating a radiopaque foreign body, and definitive surgical exploration with intraoperative fluoroscopic confirmation enabled complete removal of the foreign body and en bloc excision of the cyst. Histopathology established the diagnosis and explained the pultaceous keratinous contents encountered intraoperatively. The case underscored the importance of considering epidermal inclusion cyst and retained foreign body in the differential diagnosis of painless, progressively enlarging dorsal wrist swellings, particularly following trauma, to facilitate timely diagnosis and curative treatment.

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