

Surfinoma: a case report on a pseudotumor developing after a surfing sports injury

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Abstract We describe an unusual pseudotumor of the upper thorax, axillary, and shoulder girdle region with presentation 4 years after a surfing sports injury. We offer the coined term “Surfinoma” to describe a pseudotumor arising from a penetrating piece of fiberglass surf board, which induced a foreign body reaction.

Keywords Surfboard surfing injuries · Pseudotumor · Surfinoma · Surfing injury pseudotumor · Imaging

Introduction

Pseudotumors associated with surfing injuries are rare. We describe a case report of a 'Surfinoma' located in the left latissimus dorsi muscle resulting from a fragment of fiberglass surfboard being left within the patient after surgical wound closure. Clinically it presented as a mass with a draining sinus in the left axilla. The imaging appearances on plain radiograph, ultrasound, and CT will be described.

Case report

A fit 54-year-old man presented with a soft tissue mass and a draining sinus in the left axillary region 4 years after a surfing sports injury.

Past medical history revealed a surfboard injury 4 years ago that occurred at a remote coastal Australian beach. At this time, he was impaled by a surfboard when 'dumped' by a wave.

No imaging was performed at the peripheral hospital emergency department prior to wound lavage and laceration repair. Deep skin lacerations occurred to the upper thorax-shoulder girdle area. The wound was sutured. Since that time the patient developed a soft tissue mass that slowly increased in size. There was persistent skin discoloration. The skin subsequently began to break down and become ulcerated with a purulent discharge. A year after the sports injury, radiographs of the upper thorax and axillary region as well as ultrasound were reported as normal. The radiographs did show the piece of surf board at the lower portion of the film, however this was missed. The radiographs and ultrasound study were specifically ordered for review for bony and soft tissue pathology around the

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shoulder joint and the radiologist apparently did not assess peripheral to this. The patient re-presented for evaluation and treatment 4 years after the surfing accident with a large soft tissue mass and fluid discharge.

Physical examination revealed a palpable mass deep to the draining sinus in the skin overlying the left latissimus dorsi. The mass became more prominent with forward elevation of the shoulder and the latissimus function was normal. There was some reddening of the skin, which raised suspicion of an infection.

Diagnostic work-up included radiographs (Fig. 1), which were taken of the left shoulder and upper thorax region 4 years after the trauma. These radiographs showed a soft tissue mass with several radio-opaque triangular foreign bodies within the left latissimus dorsi muscle and adjacent subcutaneous region. Gas was apparent within portions of the foreign body cluster. No bone involvement was evident. These radiographs were followed by an ultrasound investigation (Fig. 2) and computed tomography (CT) (Fig. 3a–d). Ultrasound revealed foreign bodies measuring 4.6×3.4 cm that were 5 mm from the skin surface. There was also a smaller piece superior to the largest fragment measuring 6 mm, 4 mm from the skin surface. Concern was raised for a possible small fluid collection or abscess formation inferior to the foreign bodies. CT demonstrated the hyper dense hollow fiber-

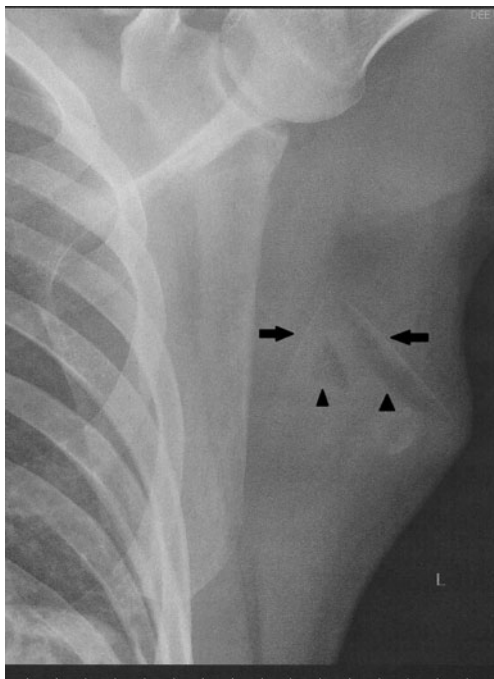


Fig. 1 Frontal radiograph of left upper thorax showing an obvious soft tissue mass with several radio-opaque triangular foreign bodies within the left subcutaneous region and latissimus dorsi muscle (arrows). Gas was apparent within portions of the foreign bodies (arrowheads). No bone involvement was evident

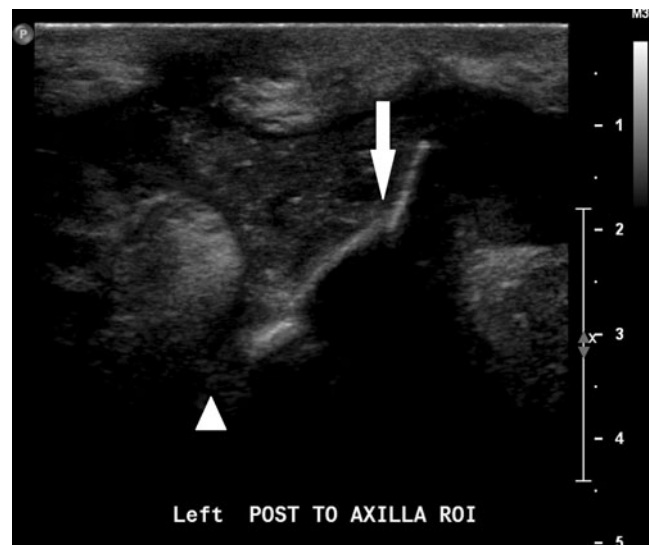


Fig. 2 Left axillary ultrasound image showing foreign bodies within the left axillary region measuring 4.6×3.4 cm (arrow) that were 5 mm from the skin surface. There was also a smaller piece superior to the largest fragment measuring 6 mm, 4 mm from the skin surface. Concern was raised for a possible small fluid collection, abscess formation adjacent to the foreign bodies (arrowhead)

glass surfboard tip with gas components. Deep to the sinus tract there was an associated 4×4 cm focal fluid collection consistent with abscess formation. Some small regions of focal fatty atrophy of adjacent muscle were present, consistent with chronicity of injury.

Surgery was performed (Fig. 4) along with wound debridement and irrigation. The debrided tissue was subsequently sent for pathologic review.

Macroscopic histopathology demonstrated a tan and brown soft tissue mass which was $25 \times 20 \times 7$ mm in aggregate. Microscopically, there was florid suppurative acute inflammatory exudate with associated foreign body-type multinucleated giant cells associated with birefringent foreign material and refractile non-birefringent foreign material (Figs. 5 and 6). No neoplasia was present. A diagnosis of suppurative inflammation and foreign body reaction was made.

Microbiologic examination revealed a large number of leukocytes, however no specific bacteria could be cultured.

Based on clinical picture, imaging, surgical specimen, and histopathology, a diagnosis of a surf board fragment with foreign-body reaction was made.

Upon review of all the material, it is difficult to determine if the long-standing process was solely a foreign-body reaction eventually leading to skin breakdown and then secondary infection, or a chronic low-grade infection (over several years) eventually leading to skin breakdown. The histopathology has both a foreign-body reaction as well as signs of infection and either scenario would likely give similar histopathology. The reason the

Fig. 3 **a** Axial CT soft tissue window. Images of the surfboard fragment in the transverse plane demonstrate the hyper dense hollow fiberglass surfboard tip within the left axilla (*arrow*) with gas within some components. **b** Axial CT soft tissue window. Deep to the sinus there was an associated approximate 4×4 cm focal fluid collection consistent with abscess formation (*arrowhead*). Some small regions of focal fatty atrophy of adjacent muscle were present, consistent with chronic history of injury. **c** Coronal CT soft tissue window. Images of the surfboard fragment in the coronal plane demonstrate the hyper dense hollow fiberglass surfboard tip within the left axilla (*arrow*) with gas within some components. A smaller fragment is also visible superior to the largest fragment. **d** Axial CT bone window: Images of the surfboard fragment in the transverse plane demonstrate the periphery of the fiberglass surfboard tip is a similar density to that of cortical bone (*arrow*)

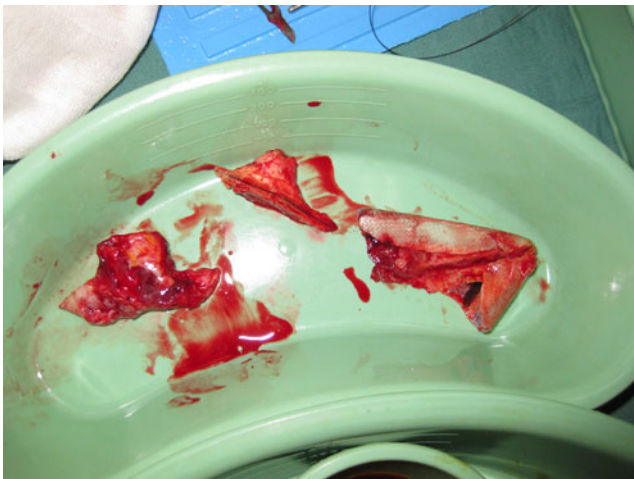
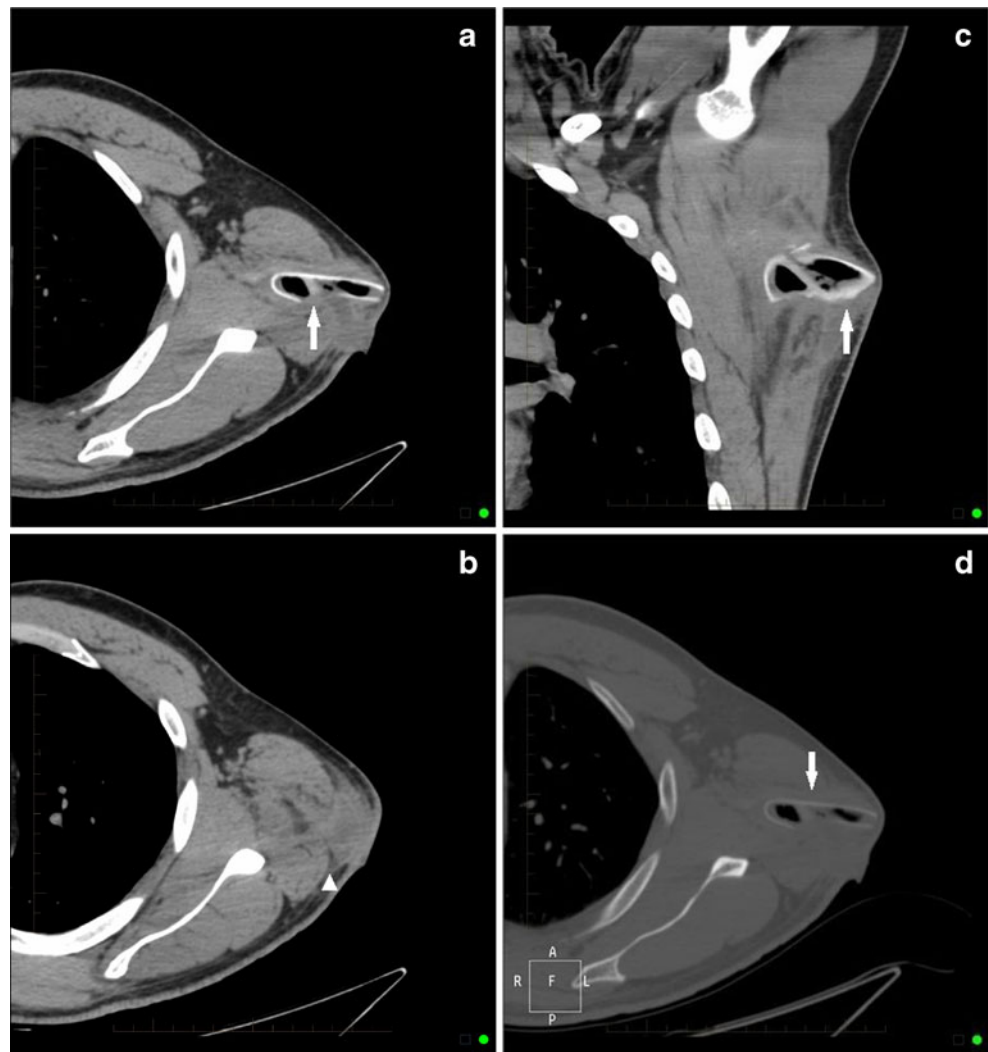


Fig. 4 Digital photograph showing the removed surfboard fragments after open surgery

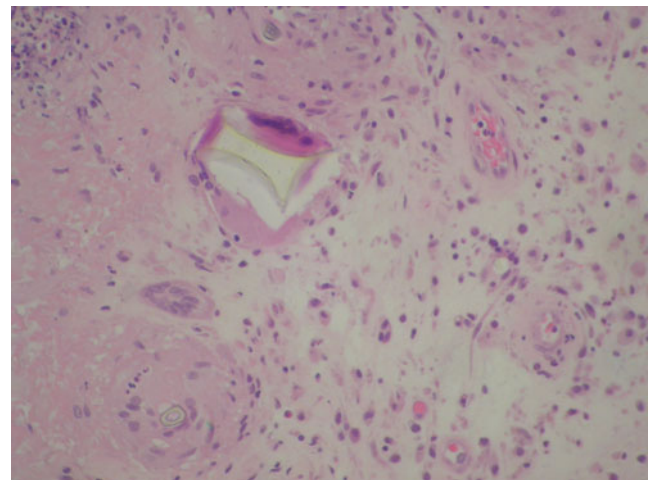


Fig. 5 Hematoxylin and eosin (H&E) stained histopathology image: foreign-body component is shown in *center upper field*. These components were evident throughout the specimen

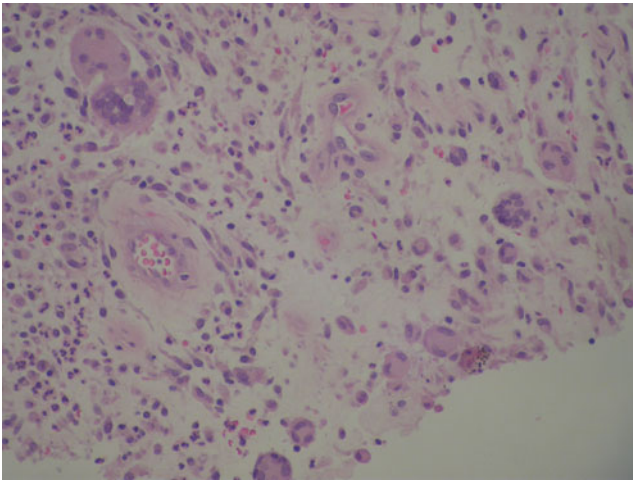


Fig. 6 Hematoxylin and eosin (H&E) stained histopathology image: chronic inflammatory cellular response

cultures were negative was that the house doctor had commenced antibiotics prior to review by the surgeon and these were likely to have altered the appearances and to have treated any organism present. However, given the long clinical time period from injury to presentation, with large retained surf board components and absence of the usual abscess-related symptomatology resulting from relatively short inflammatory aspects, i.e., fluctuant painful mass with history of rigors, sweating, etc. The foreign-body reaction would seem the predominant etiology.

Follow-up was performed 6 days after removal of the surfboard tip. The patient had no pain and completed a course of oral antibiotics. His shoulder had recovered full range of movement and there were no signs of inflammation. At 6 months follow-up, the patient had made a full recovery.

Discussion

To our knowledge, there have been no cases of a pseudotumor caused by a fiberglass surfboard. We coin the term “Surfinoma” to describe the origin of the foreign body.

Radiological imaging is recommended prior to debridement and laceration repair following any sports-related injury occurrence, particularly where equipment is missing after an accident. This would decrease the likelihood of such foreign bodies being left in deep structures.

There is not a large amount of literature available on surfing injuries. The main areas of concern include superficial lacerations, spinal injury, and stings from marine animals. The most common surfing injuries include lacerations (41%) and soft tissue injuries (35%) [1]. Twenty-five percent of the lacerations were caused by the sharp fin, tail, or nose of the surfboard [2, 3].

Injury from the rider's own surfboard is the prevailing mechanism of injury in most cases of laceration.

However, there are other hazards of surfing. Interaction with marine animals may lead to injury through envenomation [4]. Stingrays and coral reefs present further hazards to the surfboard rider. Otologic sequelae of surfing include auditory exostoses, ruptured tympanic membrane, and otitis externa. Also, non-traumatic ischemic spinal cord injury, believed to be related to prolonged spine hyperextension while lying prone on the surfboard, has also been described [5]. Fortunately, these complications are rare, with only ten cases reported.

A significant percentage of total acute injuries in surfboarding involve the head and neck, but major orbital or ocular trauma is infrequent. Ophthalmic injuries are typically due to blunt trauma from collision with the surfboard, although penetration of orbital tissues by blade-like fragments of fiberglass may lead to orbital scarring [6].

To our knowledge, no foreign-body pseudotumors related to surf injuries have been described. Other causes of pseudotumors unrelated to surf board injuries have been well documented. Cases include inflammatory granulomas caused by gauze left in patients after surgery. Twenty-five years prior to presentation, a 41-year-old man had a femoral fracture stabilized with a steel plate. The femur healed uneventfully and the patient was asymptomatic for the following 20 years. He then noticed a slow-growing swelling of the left thigh associated with a degree of weakness. Radiographs of the femur 25 years after fracture stabilization showed a massive expansive osteolytic process surrounded by a rim of bone. Magnetic resonance imaging (MRI) confirmed the presence of a large tumor. Since malignancy could not be excluded, the patient underwent incisional biopsy. The histologic findings were nonspecific. Intraoperatively, a folded cotton sponge was found adjacent to the femur. Histopathologic investigation confirmed a foreign-body reaction was probably related to the retained cotton sponge [7–10].

Retained surgical sponge or gossypiboma in the abdominal cavity is an infrequent but serious surgical complication that may lead to legal consequences. The incidence of a surgical sponge retained at operation is difficult to estimate, but it has been reported as 1 in 100 to 3,000 for all surgical interventions and 1 in 1,000 to 1,500 for intraabdominal operations. The natural evolution of a retained sponge, if aseptic, is to cause a foreign-body reaction, followed by organization to form a foreign-body granuloma, which may mimic a soft tissue neoplasm [11]. Although gossypiboma are rarely seen in daily clinical practice, it should be considered in the differential diagnosis of acute mechanical intestinal obstruction in patients who have a previous history of laparotomy. Meticulous count of surgical materials in addition to thorough exploration of

surgical site at the conclusion of operations may avoid gossypiboma formation [12].

Pseudotumors may also be related to orthopedic implants, as was found in a patient who previously had undergone a fractured humerus repair. Two years later, the patient presented with increased pain and swelling. Radiological examination revealed gross cystic enlargement of the humerus with loose implants. Histologically, there were chronic non-specific inflammatory cells present, indicating a pseudotumor [13].

Other cases of foreign-body pseudotumors causing a sinus tract have been described. A case report by Dux et al. describes migration of a retained surgical sponge into the bowel, causing a bowel obstruction. Unique about the case presented was that a barium meal follow-through study revealed a duodenal fistula that had developed after uneventful cholecystectomy due to a retained surgical sponge that had migrated into the duodenum and obstructed the distal jejunum [14].

Liu et al. describe a wooden foreign body embedded in the right globe of the eye from a traumatic injury. Although the foreign body was removed, a large right lower lid abscess developed. This recurred after drainage coupled with systemic antibiotics and a fistula was noted [15].

Treatment of a Surfinoma should consist of removal of the foreign body with debridement and irrigation followed by accurate closure of layers. The patient should also be prescribed antibiotics and followed up at a later date to decrease the likelihood of abscess formation.

Conclusions

A Surfinoma is a pseudotumor arising from a penetrating piece of fiberglass surf board that induces a foreign-body reaction. This is a rare case aimed to educate regarding surf board injuries and mechanisms. Increased awareness of this rare complication may facilitate early recognition and treatment resulting in improved outcome for the patient.

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References

1. Lowdon BJ, Pateman NA, Pitman AJ. Surfboard-riding injuries. *Med J Aust.* 1983;2(12):613–4.
2. Taylor DM, Bennett D, Carter M, Garewal D, Finch CF. Acute injury and chronic disability resulting from surfboard riding. *J Sci Med Sport.* 2004;7(4):429–37.
3. Nathanson A, Haynes P, Galanis D. Surfing injuries. *Am J Emerg Med.* 2002;20(3):155–60.
4. Taylor KS, Zoltan TB, Achar SA. Medical illnesses and injuries encountered during surfing. *Curr Sports Med Rep.* 2006;5(5):262–7.
5. Avilés-Hernández I, García-Zozaya I, DeVillasante JM. Non-traumatic myelopathy associated with surfing. *J Spinal Cord Med.* 2007;30(3):288–93.
6. Hall G, Bengner R. Missed diagnosis of an intraorbital foreign body of surfboard origin. *Ophthalmic Plastic Reconstr Surg.* 2004;20(3):250–2.
7. Hsu C-H, Lee C-M, Lin S-Y. Inflammatory pseudotumor resulting from foreign body in abdominal cavity detected by FDG PET. *Clin Nucl Med.* 2003;28(10):842–4.
8. Tzeng J-E, Wei C-K, Chang S-M, Lin C-W. Surgical gauze pseudotumor (Gauzoma)—a case report. *Tzu Chi Med J.* 2006;18:49–51.
9. Mboti B, Gebhart M, Larsimont D, Abdelkafi K. Textiloma of the thigh presenting as a sarcoma. *Acta Orthopædica Belgica.* 2001;67:5.
10. Kalbermatten DF, Kalbermatten NT, Hertel R. Cotton-induced pseudotumor of the femur. *Skeletal Radiol.* 2001;30(7):415–7.
11. Yuh-Feng T, Chin-Chu W, Cheng-Tau S, Min-Tsung T. FDG PET CT features of an intraabdominal gossypiboma. *Clin Nucl Med.* 2005;30(8):561–3.
12. Gencosmanoglu R, Inceoglu R. An unusual case of small bowel obstruction: Gossypiboma: a case report. *BMC Surg.* 2003;3:6.
13. Prabhakar MM, Harshvadhan J. Pseudotumor humerus: an uncommon case of foreign body reaction to orthopaedic implants. *Internet J Orthop Surg.* 2008;10(1).
14. Dux M, Ganten M, Lubienski A, Grenacher L. Retained surgical sponge with migration into the duodenum and persistent duodenal fistula. *Eur Radiol.* 2002;12:S74–7.
15. Liu D, Shail E. Retained orbital wooden foreign body. A surgical technique and rationale. *Ophthalmology.* 2002;109:393–9.