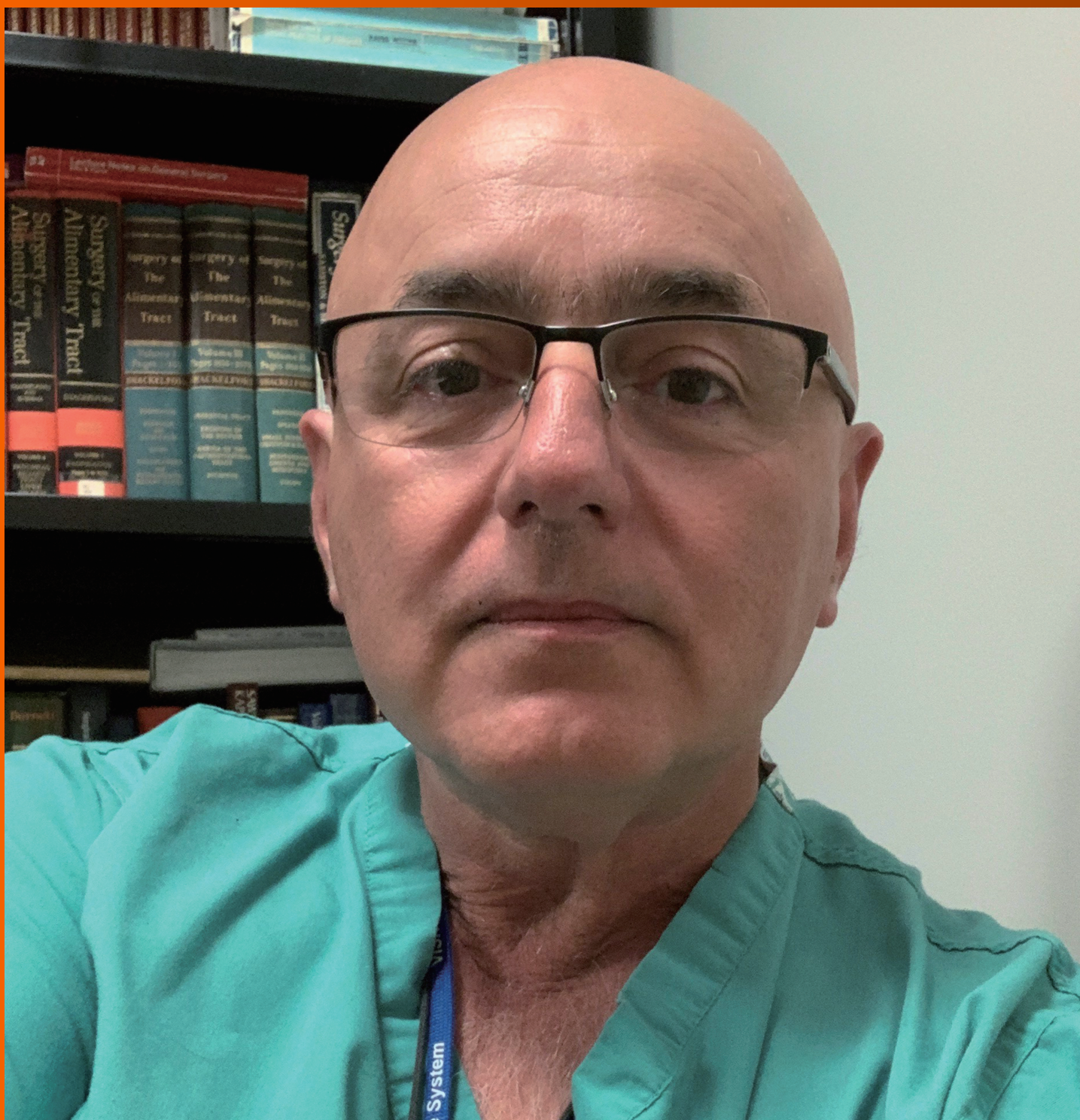


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WJCCM mainly publishes articles reporting research results and findings obtained in the field of critical care medicine and covering a wide range of topics including acute kidney failure, acute respiratory distress syndrome and mechanical ventilation, application of bronchofiberscopy in critically ill patients, cardiopulmonary cerebral resuscitation, coagulant dysfunction, continuous renal replacement therapy, fluid resuscitation and tissue perfusion, hemodynamic monitoring and circulatory support, ICU management and treatment control, sedation and analgesia, severe infection, etc.

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Retrospective Study

Medico-legal risks associated to hand and wrist trauma

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Abstract

BACKGROUND

Acute hand and wrist injuries are common and may lead to long-term disability if not managed adequately. Claims for negligence have been increasing in medical practice over the past few decades, with hand and wrist injuries and their treatment representing a significant percentage of orthopedic surgery lawsuits. There is no available literature regarding medical malpractice claims in hand and wrist injuries and surgery in Greece.

AIM

To identify claims related to hand and wrist trauma and surgery and to define the reasons of successful litigations.

METHODS

We performed a retrospective study of all legal claims of negligence for hand and upper extremity surgery that went to a trial, attributed to all surgical specialties, in Greece for a 20-year period. Data was further analyzed to identify claims related to hand and wrist trauma and surgery.

RESULTS

There were six malpractice claims related to hand and wrist trauma that ended in a trial. A missed diagnosis, which resulted in failure of initial management of the injury, was the main reason for a claim. Three of the six cases resulted in complete or partial loss of a finger. Two cases are still open, requiring an expert witness's report, two cases were closed in favor of the defendant, and two cases were closed

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in favor of the plaintiff with a mean compensation of €2000 (€1000-€3000).

CONCLUSION

Missed diagnosis was the main reason for a malpractice claim. Better understanding of factors leading to successful claims will help surgeons improve their practice to minimize legal implications and litigation.

Key Words: Hand trauma; Wrist trauma; Litigation; Claim; Negligence

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Core Tip: This is the first report related to hand and wrist trauma malpractice claims in Greece. Hand and wrist injuries, although non-fatal, can lead to long-term disability if a delay in diagnosis or treatment occurs. Additionally, missed diagnosis and inadequate management of these injuries can be the leading cause for medical malpractice claims, which appear to have an upward trend over the last decades. We present six malpractice claims related to hand and wrist trauma that resulted in a trial over a 20-year period in Greece and their outcomes, aiming to determine the reasons that lead to successful litigations.

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INTRODUCTION

Hand and wrist injuries are common and account for approximately 10%-30% of all presentations to emergency departments (EDs), affecting mainly young and economically productive people[1,2]. Although not commonly life threatening, delayed diagnosis or mismanagement of these injuries can result in prolonged recovery and likely long-term disability, having a negative impact on patient's quality of life, income, social activities and occasionally mental health[3,4].

Claims for negligence have been increasing in medical practice over the past few decades, with hand and wrist injuries and their treatment representing a significant percentage of orthopedic surgery lawsuits[5,6]. There are a few articles addressing the issue of malpractice in hand and wrist surgery, with most studies being performed in Europe[6]. However, there are no reports related to medical malpractice claims in hand and wrist injuries and surgery in Greece.

The purpose of this study was to seek the available data about medical malpractice in hand and wrist trauma and surgery in Greece, to define the reasons and to evaluate the burden of successful litigations in Greece and to compare this data with the international malpractice data.

MATERIALS AND METHODS

Data on all legal claims of negligence for hand and upper extremity surgery attributed to all surgical specialties that ended in a trial during the period of 2000-2019 was obtained after permission from the archives of the Council of State in Greece. We further analyzed the data to determine the number of claims related to hand and wrist trauma, the reasons that a claim was filed, the outcome of each claim and the financial size of the plaintiff's compensation in the case of a successful claim.

Our study was approved by our institutional research ethics board. All data was anonymized as indicated by the General Data Protection Regulation.

RESULTS

Among the malpractice claims related to hand and upper extremity surgery that went to a trial in the period between 2000 and 2019, six cases were correlated to hand and wrist trauma. Missed diagnosis, which resulted in failure of management and in one case in delayed referral to a specialized unit, was the main reason for a claim. Substandard surgery was an additional reason for claim in one case.

The mean time between injury and definite treatment was 9.1 (1-25) d. In all but one case adult patients were involved. The majority of cases (5) concerned the soft tissues, while one case was related to a wrist bone (scaphoid fracture). Three of six cases resulted in complete or partial loss of a finger.

Two of six cases are still open, requiring an expert witness's report, two cases were closed in favor of the defendant, and the remaining two cases were closed in favor of the plaintiff, with a mean compensation of €2000 (€1000-€3000). A brief summary of each case follows.

Case 1

A 51-year-old man presented to the ED of a district hospital on a Greek island, reporting high pressure injury of the proximal phalanx of his left index finger while cleaning a painting machinery. He was initially reviewed by a general surgery resident who under the guidance of a general surgeon cleaned the wound. On a follow-up visit 3 d after the injury, the wound was found to be necrotic. Due to lack of an orthopedic surgeon in the hospital, he was advised to visit the hospital of a nearby island, where this specialty was available. Following assessment by an orthopedic surgeon there, the patient was finally referred to a plastic surgery unit in Athens. Six days after the injury, the patient underwent an amputation of his left index finger at the level of the metacarpophalangeal joint.

A claim was filed by the patient stating that the amputation was the result of missed diagnosis and delayed referral to a specialized hand trauma unit. The case is still open, and an expert witness's report is required before a final decision is made.

Case 2

A fireman presented to the ED of a general hospital with a deep laceration of his left thumb following an injury by a satellite dish. The patient was reviewed by an orthopedic surgeon, and the wound was closed. On follow-up visit 15 d later, the patient complained of persistent pain and inability to move his thumb. Despite his complaints, no further action was taken. Due to persistence of symptoms 25 d after his injury, the patient was examined by a hand surgeon, and laceration of the flexor pollicis longus and the digital nerve was diagnosed. Reconstruction of the structures followed.

The patient filed a claim for initial missed diagnosis of his injury with subsequent late reconstruction and delay in his recovery. Compensation of €1000 was set for the patient. The case closed 8 years after the claim was filed.

Case 3

A 40-year-old woman presented to the ED of a general hospital with pain and swelling of her index finger and her thumb following an injury with a knife 4 d before. She was examined by a plastic surgery resident, who prescribed oral antibiotics and suggested reassessment in 2 d. The following day the patient was examined in a different hospital, where infection of her right hand and ischemic changes of the index finger were reported, necessitating surgical debridement. Four days later, in a specialized hand and microsurgery unit of a private hospital, the patient underwent amputation of the distal phalanx, further debridement of the index finger and reconstruction with a cross-finger flap. The patient filed a claim reporting missed diagnosis and improper management of her injury. The case was closed in favor of the defendant 10 years after the claim was filed.

Case 4

A woman presented to the ED of a general hospital following an injury to her left wrist with a glass. She was reviewed by both an orthopedic and a general surgeon. The wound was closed, and oral antibiotics were prescribed. On reassessment 12 d later, laceration of her ulnar nerve was diagnosed. Therefore, she was referred to a specialized unit and had her ulnar nerve repaired. Despite management in a specialized center, the patient was not able to fully use her left hand postoperatively. The patient filed a claim reporting missed diagnosis of her injury. The case was closed

in favor of the plaintiff and compensation of €3000 was set. The case closed 7 years after the claim was filed.

Case 5

A man presented to the ED of a general hospital following a fall from 2.5 m height and injury of his left wrist. He was assessed by an Orthopedic Surgery resident, and a radiograph was performed the same day. His wrist was splinted, and a follow-up visit was scheduled in 8 d. The follow-up radiograph depicted a fracture of the scaphoid bone, and 2 d later the patient was treated surgically. The fracture was fixed with Kirschner wires. Intraoperatively, one of the wires broke, and the remnant of the wire was left in the bone. The patient complained of reduced range of motion of his left wrist postoperatively. The patient filed a claim reporting missed diagnosis and substandard surgery. The case is still open, and an expert witness's report is required before a final decision is made.

Case 6

A 9-year-old boy was brought to the ED of an urban general hospital by his parents following a crush injury to his left index, middle and ring fingers. He was there assessed by a general surgery resident who sutured the lacerations. Three days later the boy was brought back to the ED due to ischemic changes to his middle finger. Despite admission in the hospital, the parents' wish was to visit a pediatric surgeon in another hospital. A degloving injury of the boy's middle finger was diagnosed, and amputation of the finger was performed (the level of the amputation was not mentioned in the claim). The family filed a claim reporting missed diagnosis of the boy's injury and subsequent mismanagement. The case was finally closed in favor of the defendant 7 years later.

Verdicts

In our study two cases were closed in favor of the plaintiff and two cases were closed in favor of the defendant. The reasonings behind the court's final decisions varied. Documentation, rarity of injury, functional outcome and delay in recovery have been the main reasons for the verdicts.

The two cases which were closed in favor of the plaintiff involved delay in the diagnosis of ulnar nerve laceration and of flexor pollicis longus and digital nerve laceration. In the first case, compensation was set because there was no full recovery of the nerve, even though the reconstruction was performed within the allowed time-period for nerve reconstruction. According to the decision, nerve reconstruction within the first days of the injury would have higher chances for full recovery. In the second case there was full recovery of both the nerve and the tendon despite the delay in diagnosis. However, due to the delay in diagnosis the plaintiff experienced pain and inability to use his hand for 25 d until the reconstruction of the structures and that was the reasoning for a verdict in favor of the plaintiff.

The two cases that were closed in favor of the defendant involved a degloving injury of a finger and an infection of a finger. The first case concerned a rare injury of the finger, the degloving injury, which a junior resident of an allied specialty (general surgery) was unlikely to know and have experience on its management. The degloving injury of the finger would be approached by every non-experienced doctor in the way the involved doctor did. The verdict of the second case was based on the clear documentation the involved doctor presented regarding the findings on the day of examination. The different and contradictory clinical presentation that the plaintiff contended could not be supported by any documentation or image to prove any inaccuracy in the doctor's documentation.

DISCUSSION

Acute hand and wrist injuries represent a common cause of visit to the ED. Hand injuries occur with a significant rate, constituting a considerable proportion of non-fatal injuries requiring medical attention[3]. Missed diagnosis and subsequent inadequate initial management of these injuries may lead to a prolonged period of disability and absence from work and social activities, further procedures and potentially a suboptimal outcome. The hand has complex anatomical and functional features and may be affected by a wide range of trauma, ranging from simple lacerations to injuries that require multiple reconstructive procedures. Adequate knowledge of the different mechanisms of injury and their association with certain

patterns of injury is essential to help the surgeon decide on the diagnostic and therapeutic process[4].

In Greece, hand and wrist injuries that present to the ED are initially assessed by orthopedic, plastic or general surgery residents, who usually review the cases with a consultant. The residents examine the patient, request laboratory and imaging evaluations and decide treatment in "simple" cases, while complex cases that cannot be managed in the hospital are referred to specialized hand surgery units. In district hospitals, initial assessment and management is performed by an orthopedic or a general surgeon. However, management of hand injuries by non-specialists (residents or consultants) carries the risk of poor outcome with subsequent increase in the cost for the patient, employer and society as stated by Kenesi and Masmejean in 2004[7].

Claims for negligence is a global problem with an upward trend[5]. According to the Greek Penal Code (article 28) "whoever due to lack of attention - that he should and could have paid according to the circumstances - didn't foresee the punishable result which his action caused or had foreseen it as possible but didn't believe it would actually happen, is acting in the content of negligence". Gidwani *et al*[8] reported substandard surgery and delay in diagnosis or treatment having been the most frequent reasons for litigation[8-10]. Similarly, in a study of all claims related to hand injuries against EDs in England during the period 2004-2014, failure or delay in the diagnosis and in the treatment of the injury were the two most common reasons for litigation[10].

Despite best efforts, hand and wrist injuries may be missed, and therefore proper management can be delayed. Morrison *et al*[11] studied 500 acute hand injuries that were referred to the Regional Plastic Surgery Unit in Northern Ireland. There were 16 (3.2%) missed injuries, and these were more common in patients examined by junior medical staff and in patients with trauma caused by glass. In minor lacerations the extent of the underlying injury can sometimes be underestimated. Previous studies reported that perioperative clinical findings of upper limb injuries may have an 8%-14% error rate when compared to intraoperative findings. Miranda *et al*[12] compared the clinical and intraoperative findings of 1526 hand injuries that were referred to a Hand Trauma Unit. Flexor tendon injuries were associated with a poor diagnostic concordance, while lacerative injuries were most likely to be associated with additional injuries. Mahdavian Delavary *et al*[7] studied all the claims related to hand and wrist injury for a period of 15 years in the Netherlands. A significant number of claims were related to the management of wrist fractures, while the commonest cause for a claim was inadequate management (34.8%), followed by missed diagnosis (33.8%). In the same study, 102 cases involved a missed nerve or tendon injury after a cut, and in 74.5% of these misdiagnosed cases, initial diagnosis was made by a resident. Finally, it was concluded that general surgeons, who occasionally treat hand conditions, were more likely to be involved in litigation[7].

In an ED setting the assessment of hand injuries can be challenging. Distracting injuries may also be present, patient's compliance may be poor due to alcohol or substance use, complexity of hand anatomy and the involvement of junior doctors or general surgeons, with limited experience in hand surgery can all contribute to errors [10].

In general, management of fractures has been associated with a high risk of claims. It has been reported that approximately 49% of the upper extremity claims are related to fracture management. The higher risk is associated with the patient's expectation to return to their pre-injury condition and with treatment by the on-call doctor, who may have a different area of expertise[14].

Scaphoid fractures are common wrist injuries, accounting for 82%-89% of carpal injuries. However, radiographs are often false-negative, and thus their contribution in diagnosing this injury is poor[13]. Litigation in wrist trauma is common with 48% of the claims related to hand and wrist surgery being for wrist fractures according to a study of Khan and Giddins[9]. Ring *et al*[13] studied all orthopedic claims registered in the National Health Service Litigation Authority between 1995 and 2012. Of all registered orthopedic claims, 36.3% were related to wrist and scaphoid fractures, with an average settlement per case of £45500 for wrist fractures and £51500 for scaphoid fractures[13]. The main reasons for successful claims was delayed, incorrect or missed diagnosis (43.5%), followed by alleged mismanagement (29.5%), poor patient care (10.1%) and alleged incompetent surgery[13].

Soft tissue injuries of the hand represent up to 82% of all hand injuries assessed in EDs. They can range from simple lacerations to more complex injuries requiring structural repair, with the high-pressure injection injuries being the "most urgent of all emergencies of the hand". High-pressure injection injuries, although not very frequent with an estimated incidence of 1 in 600 injuries, can be catastrophic for the patient if

Table 1 Learning points from the present study

First report of medical negligence claims related to hand and wrist trauma and surgery in Greece
Missed diagnosis was the main reason for filling a claim in hand and wrist trauma surgery
Missed diagnosis and subsequent inadequate management resulted in partial or complete loss of a finger in half of the cases
Junior doctors and doctors from allied specialties (other than orthopedic or plastic surgery) were involved in most of the claims
The main reasoning of the verdicts included accurate documentation, rarity of injury, functional outcome and delay in recovery

not referred to a hand unit promptly and not managed adequately. They have been associated with a high risk of amputation of the affected finger, ranging from 16% to 48% as well with the risk of systemic intoxication, if missed and not treated appropriately[15]. On the contrary, tendon injuries are common with an incidence of approximately 33.2 injuries per 100000 person-years and accompany most penetrating injuries of the hand. A concomitant tendon injury may be present in 54.8% of small lacerations and 92.5% of deep injuries through a small laceration[16].

Claims for negligence have been increasing in medical practice over the past few decades. In a retrospective study by Ajwani *et al*[5] of 325 successful claims related to hand and wrist injuries and surgery in England from the period 2002-2012, payouts for hand injuries were reported to range from £1000 to £374077 while for wrist injuries from £200 to £669471. In the same study, poor outcome, nerve damage, unnecessary pain due to delayed diagnosis or management, additional procedures and fracture were identified as the commonest reasons for successful litigation[5].

In our study, all claims were for missed diagnosis that resulted in delay of proper treatment. The amounts of plaintiff's compensation (€1000, €3000) were lower compared to the ones described in the literature. The limited case law regarding compensation for hand and wrist injuries in Greece may explain the low compensation payments. Additionally, more than half of the cases were initially examined and treated by residents in plastic, orthopedic or general surgery, and failure in diagnosis was attributed to them by the plaintiff. In one case a high-pressure injury was assessed and managed by a general surgeon, who did not have experience in the management of this pattern of injury.

In the present study we reviewed only the claims related to hand and wrist trauma that went to a trial. It cannot be interpreted as representative of all malpractice claims in hand and wrist trauma. At present, there is no official authority in Greece where all negligence claims can be registered. Therefore, we cannot estimate the total amount of negligence claims for hand and wrist trauma that were filed between 2000 and 2019 and the number of claims that were settled outside court (Table 1).

CONCLUSION

This is the first report of medical negligence claims related to hand and wrist injuries that went to a trial in Greece. We presented six cases of hand and wrist trauma that reached the court room and their decisions. The main cause for filing a claim was missed diagnosis, which resulted in delayed management and in loss of a finger in 50% of cases. Hand and wrist injuries are common with possible long-term disability if treated inadequately. Therefore, a better understanding of the factors that lead to successful claims will help surgeons improve their practice to minimize legal implications and litigation.

ARTICLE HIGHLIGHTS

Research background

Medical negligence claims have presented an upward trend over the last decades worldwide, with hand and wrist liability representing a significant burden of orthopedic surgery lawsuits. Hand and wrist injuries are common, affecting mainly young and economically productive people. However, even small injuries may lead to long-term disability if treated inadequately, with affected people becoming unable to work, socialize and perform routine daily activities.

Research motivation

Literature addressing the issue of malpractice in hand and wrist surgery has been scarce, with most studies being performed in Europe and the United States. However, there are no studies related to liability in hand and wrist trauma and surgery in Greece.

Research objectives

The purpose of this study was to identify medical malpractice claims in hand and wrist surgery in Greece, to define the reasons for filing a claim and to define the reasons of successful litigations. Additionally, the results of the study were compared with the international malpractice data.

Research methods

This is a retrospective study of all medical malpractice claims for hand and upper extremity surgery that went to a trial attributed to all surgical specialties in Greece over a 20-year period. Claims were further analyzed to identify claims related to hand and wrist trauma and surgery.

Research results

We presented six medical malpractice cases related to hand and wrist trauma that ended in a trial. Missed diagnosis and subsequent failure of initial management of the injury was the main reason for filing a claim. In half of the cases mismanagement resulted in complete or partial loss of a finger. Two cases are still open, two cases were closed in favor of the defendant, and two cases were closed in favor of the plaintiff with a mean compensation of €2000.

Research conclusions

This is the first report of medical negligence claims related to hand and wrist trauma in Greece. A missed diagnosis of hand and wrist injury can result in long-term disability for a patient and has been the main reason for a malpractice claim. In the present study, missed diagnosis resulted in partial or complete loss of a finger in half of the cases.

Research perspectives

Better understanding of the factors that lead to successful claims can result in the improvement of services to hand trauma patients and will help surgeons improve their practice to minimize legal implications and litigation.

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