

Shoulder disarticulation after clavicle fracture: a case report

✉ Bilge Kağan Yılmaz,¹ ✉ Mohamed Salah Ali,² ✉ İbrahim Ethem Bütüner,³ ✉ Gökhan Maralcan⁴

¹Department of Orthopaedics and Traumatology, Afyonkarahisar Health Science University, Afyonkarahisar-Türkiye

²Department of Orthopaedics and Traumatology, Mustafa Kemal Paşa State Hospital, Bursa-Türkiye

³Department of Orthopaedics and Traumatology, Sorgun State Hospital, Yozgat-Türkiye

⁴Department of Orthopaedics and Traumatology, Okan University, İstanbul-Türkiye

ABSTRACT

In this case report, we presented to a 90-year-old female with multiple comorbidities presented to the emergency department of our hospital three weeks following a fall from standing height. Upon arrival, the patient exhibited a Glasgow Coma Scale (GCS) 12, blood pressure of 100/60 mmHg, heart rate of 117 beats/min, respiratory rate of 24 breaths/min. Examination revealed atrophy, skin color change, sensory disturbance, or motor palsy in the left upper extremity. Chest X-ray showed a fractured left clavicle, with its free fragment dislocated toward the thorax. She was diagnosed with a displaced midshaft clavicle fracture, Arbeitsgemeinschaft für Osteosynthesefragen (AO) type 15.2B2. On doppler ultrasound examination, flow loss secondary to compression was observed in the proximal left subclavian artery (SA). No flow was observed in the axillary, brachial, radial and ulnar arteries. Due to the patient's high number of comorbid diseases and poor general condition, disarticulation was performed from the shoulder joint, which is the proximal region of arterial occlusion. No other symptoms of circulatory dysfunction were observed at the 3 months follow-up. This case report emphasizes that delayed clavicle fracture can lead to catastrophic consequences. Trauma surgeons should also consider surgical treatment of clavicle fractures, depending on the patient's condition.

Keywords: Clavicle fractures; compression; disarticulation; vascular complication.

INTRODUCTION

Clavicle fractures are common in orthopedic practice. They account for 44% of upper extremity injuries and 2.6-4.0% of all fractures. When clavicle fractures are evaluated, it is seen that 80% are in the middle third or midshaft area. Neurovascular injuries associated with closed and isolated fractures of the clavicle are rare, frequently associated with penetrating trauma.^[1] The most common mechanism of injury for clavicle fractures is a fall onto the palm of the hand or a point on the shoulder. Additionally, clavicle fractures can occur due to direct or indirect trauma associated with contact sports.

Despite the close proximity of the clavicle to the subclavian

vessels, vascular complications after clavicle fractures are rare.^[2] These complications are often seen after penetrating injuries. However, in cases of nonunion after a clavicle fracture, complications such as arterial stenosis and pseudoaneurysm caused by external compression from hypertrophic callus formation may occur. These can be defined as delayed complications.^[3] These complications manifest as symptoms of thoracic outlet syndrome (TOS) and impaired circulation in the distal extremity.^[4]

We report a case of shoulder disarticulation resulting from arterial mechanical compression in a patient who presented late following a clavicular fracture.

Cite this article as: Yılmaz BK, Ali MS, Bütüner İE, Maralcan G. Shoulder disarticulation after clavicle fracture: A case report. *Ulus Travma Acil Cerrahi Derg* 2024;30:835-838.

Address for correspondence: Bilge Kağan Yılmaz

Department of Orthopaedics and Traumatology, Afyonkarahisar Health Science University, Afyonkarahisar, Türkiye

E-mail: yilmazbk@gmail.com

Ulus Travma Acil Cerrahi Derg 2024;30(11):835-838 DOI: 10.14744/tjtes.2024.54829

Submitted: 24.04.2024 Revised: 19.08.2024 Accepted: 13.09.2024 Published: 04.11.2024

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



CASE REPORT

A 90-year-old woman with multiple comorbidities presented to the emergency department of our hospital three weeks after a fall from standing height. The patient, who did not initially seek hospital care following the trauma, was later brought to the emergency department by her relatives due to a deterioration in her general condition and discoloration of her left arm. Upon arrival, the patient exhibited a Glasgow Coma Scale (GCS) score of 12, a heart rate of 117 beats per minute, a respiratory rate of 24 breaths per minute, and a blood pressure of 100/60 mmHg. Examination revealed atrophy and motor paralysis in the left upper extremity (Fig. 1). A chest X-ray revealed a fractured left clavicle with a free fragment dislocated toward the thorax. She was diagnosed with a displaced midshaft clavicle fracture, AO (Arbeitsgemeinschaft



Figure 1. Gangrenous hand.

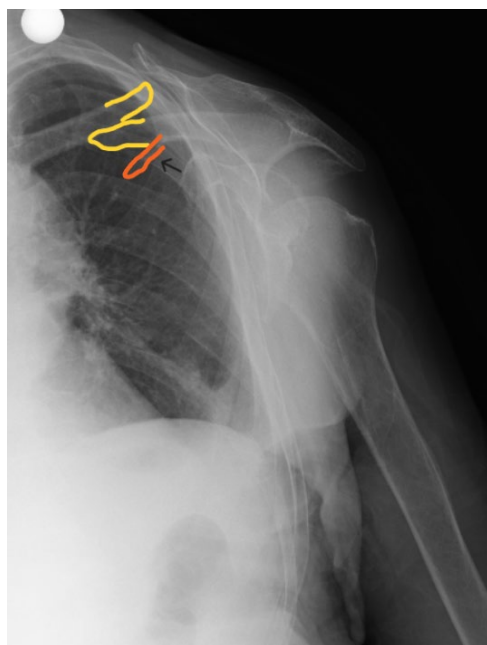


Figure 2. Clavicle fracture. Yellow lines highlight the fracture fragments. Orange lines and a black arrowhead indicate the location of the displaced free fracture fragment.

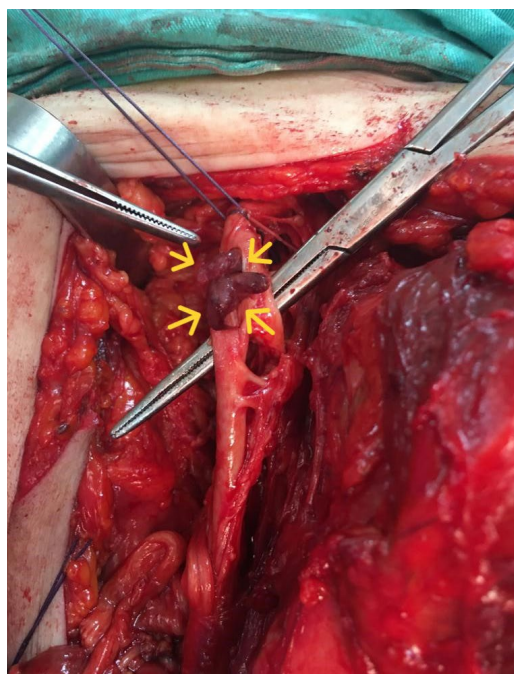


Figure 3. Subclavian artery emboli. Yellow arrowheads point to the accumulated embolic material.

für Osteosynthesefragen) type 15.2B2 (Fig. 2). Computed tomography (CT) angiography could not be performed due to the patient's glomerular filtration rate (GFR) being less than 10 mL/min. Instead, distal blood flow was assessed using Doppler ultrasound. Doppler ultrasound examination revealed flow loss secondary to compression in the proximal left subclavian artery (SA). No flow was detected in the axillary, brachial, radial, and ulnar arteries. To minimize postoperative wound complications in this patient with poor general condition and insulin-dependent diabetes, the amputation level was planned as a shoulder disarticulation rather than a transhumeral amputation. Since shoulder disarticulation was planned, no additional surgical intervention or osteosynthesis for the clavicle fracture was undertaken. The shoulder disarticulation was performed under general anesthesia. During soft tissue dissection, a thrombus in the subclavian artery was visualized following vessel exposure (Fig. 3). Postoperatively, the patient was monitored in the intensive care unit for two days. During this period, her vital signs remained stable, and her Glasgow Coma Scale score improved to 15. She was discharged with instructions for analgesic and antibiotic therapy. These treatments were discontinued at the first postoperative follow-up. At the three-month follow-up, no additional symptoms of circulatory dysfunction were observed.

The patient and her family were informed that the data from this case would be submitted for publication, and they provided their consent.

DISCUSSION

Conservative treatment should be considered as the first

treatment option for isolated clavicle fractures without additional injuries. Conservative treatments include pain reduction and temporary immobilization with a sling. Patients are followed closely to evaluate neurovascular structures and to monitor the displacement of fracture fragments. The location of the fracture, the type of fracture, and the characteristics of the patient are the main factors considered in the operative management of clavicle fractures. Operative treatment of clavicle fractures is usually performed by open reduction and internal fixation (ORIF) or intramedullary fixation (IMF).^[5] There is no clear consensus on the criteria for nonoperative or operative management of clavicle fractures. Recent publications have shown that operative treatment of clavicle fractures provides better clinical and functional recovery and higher patient satisfaction than conservative treatment.^[6] Additionally, it has been associated with lower rates of nonunion and faster return to work.^[7]

Non-operative treatment may not always be innocuous. Among the complications described in the literature are frozen shoulder,^[8] neurovascular compression, rotator cuff impingement,^[9] brachial plexus irritation,^[10] and neurological complications.^[11] These various complications appear in the literature as rare case reports. Miyake et al. reported a case of venous TOS with upper extremity deep vein thrombosis following a displaced clavicle fracture.^[12] Nicholson et al. described two cases with nonunion of the clavicle presenting symptoms of arterial TOS, who had no signs of vascular insufficiency or thromboembolic disease, stating that the symptoms were fully reversible after surgical stabilization.^[13] Demir et al. detected a left subclavian artery occlusion over 3 cm on CT angiography due to increased complaints during non-operative follow-up of a displaced midshaft clavicle fracture. At surgical repair, after subclavian to brachial bypass, they fixed the fracture with an eight-hole locking compression plate. They reported that at the six-month follow-up, fracture consolidation, full range of motion of the left shoulder, and open bypass were observed.^[14]

In the case we presented of shoulder disarticulation due to SA mechanical compression after a clavicle fracture, we stated that there may be serious complications in the non-operative treatment of clavicle fractures. In our literature review, TOS cases due to mechanical compression of callus tissue following nonunion of clavicle fractures attracted our attention. In the case we present, arterial circulation disorder and a gangrenous hand were observed after complete occlusion of the displaced fragment in the SA in a displaced midshaft clavicle fracture. Due to the patient's high number of comorbid diseases and poor general condition, arterial bypass was not planned, and left shoulder disarticulation was performed.

CONCLUSION

Despite the initial preference for conservative management, this case report highlights the critical importance of frequent

follow-up appointments for patients with clavicle fractures. In cases where complications arise during follow-up, surgical intervention may facilitate a more expedited and uncomplicated recovery.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Financial Disclosure: The author declared that this study has received no financial support.

REFERENCES

- Katras T, Baltazar U, Rush DS, Davis D, Bell TD, Browder IW, et al. Subclavian arterial injury associated with blunt trauma. *Vasc Surg*. 2001;35:43–50. [\[CrossRef\]](#)
- Clithero HD, Bain GI. Major neurovascular complications of clavicle fracture surgery. *Shoulder Elbow* 2015;7:3–12. [\[CrossRef\]](#)
- Stella E, Santolini S, Briano S, Santolini F. Late recurrent peripheral upper limb ischemia after non-union of a clavicle fracture. *Injury* 2015;46:S3–S7. [\[CrossRef\]](#)
- Kitsis CK, Marino AJ, Krikler SJ, Birch R. Late complications following clavicular fractures and their operative management. *Injury* 2003;34:69–74. [\[CrossRef\]](#)
- Hoogervorst P, van Schie P, van den Bekerom MP. Midshaft clavicle fractures. *EFORT Open Rev* 2018;3:374–80. [\[CrossRef\]](#)
- Amer K, Smith B, Thomson JE, Congiusta D, Reilly MC, Sirkin MS, et al. Operative versus nonoperative outcomes of middle-third clavicle fractures: a systematic review and meta-analysis. *J Orthop Trauma* 2020;34:e6–e13. [\[CrossRef\]](#)
- Axelrod DE, Ekhtiari S, Bozzo A, Bhandari M, Johal H. What Is the best evidence for management of displaced midshaft clavicle fractures? a systematic review and network meta-analysis of 22 randomized controlled trials. *Clin Orthop Relat Res* 2020;478:392–402. [\[CrossRef\]](#)
- Ahrens PM, Garlick NI, Barber J, Tims EM; Clavicle Trial Collaborative Group. The clavicle trial: A multicenter randomized controlled trial comparing operative with nonoperative treatment of displaced midshaft clavicle fractures. *J Bone Joint Surg Am* 2017;99:1345–54. [\[CrossRef\]](#)
- Robinson CM, Goudie EB, Murray IR, Jenkins PJ, Ahktar MA, Read EO, et al. Open reduction and plate fixation versus nonoperative treatment for displaced midshaft clavicular fractures: a multicenter, randomized, controlled trial. *J Bone Joint Surg Am* 2013;95:1576–84. [\[CrossRef\]](#)
- Virtanen KJ, Remes V, Pajarinen J, Savolainen V, Björkenheim JM, Paavola M. Sling compared with plate osteosynthesis for treatment of displaced midshaft clavicular fractures: a randomized clinical trial. *J Bone Joint Surg Am* 2012;94:1546–53. [\[CrossRef\]](#)
- Woltz S, Stegeman SA, Krijnen P, van Dijkman BA, van Thiel TP, Schep NW, et al. Plate fixation compared with nonoperative treatment for displaced midshaft clavicular fractures: a multicenter randomized controlled trial. *J Bone Joint Surg Am* 2017;99:106–12. [\[CrossRef\]](#)
- Miyake Y, Abe T, Suekane A, Goan A, Ameda T, Ochiai H. Venous thoracic outlet syndrome with an upper extremity deep vein thrombosis caused by a dislocated clavicle fracture: a case report. *American J Case Reports* 2023;24: e939250. [\[CrossRef\]](#)
- Nicholson JA, Stirling PHC, Strelzow J, Robinson CM. Dynamic compression of the subclavian artery secondary to clavicle nonunion: a report of 2 cases. *JBJS Case Connect* 2019;9:e4. [\[CrossRef\]](#)
- Demir D, Van Der Burg B, Stollenwerck R, Hoencamp H. Subclavian artery occlusion after a clavicle fracture, *BMJ Case Rep* 2019;12:e229314.

OLGU SUNUMU - ÖZ

Klavikula kırığı sonrası omuz dezartikülasyonu: Olgu sunumu**Bilge Kağan Yılmaz,¹ Mohamed Salah Ali,² İbrahim Ethem Bütünler,³ Gökhan Maralcan⁴**¹Afyonkarahisar Sağlık Bilimleri Üniversitesi, Ortopedi ve Travmatoloji Anabilim Dalı, Afyonkarahisar, Türkiye²Mustafa Kemal Paşa Devlet Hastanesi, Ortopedi ve Travmatoloji Kliniği, Bursa, Türkiye³Sorgun Devlet Hastanesi, Ortopedi ve Travmatoloji Kliniği, Yozgat, Türkiye⁴Okan Üniversitesi, Ortopedi ve Travmatoloji Anabilim Dalı, İstanbul, Türkiye

Bu olgu sunumunda geç tanı alan klavikula kırıklarının geri dönüşü olmayan sonuçlara neden olabileceğini vurgulamak istedik. Doksan yaşında, eşlik eden hastalıkları olan kadın hasta, kendi seviyesinden düştükten 3 hafta sonra hastanemizin acil servisine başvurdu. Hastanın gelişinde bilinç düzeyi Glasgow Koma Skalası (GCS) 12, kan basıncı 100/60 mmHg, kalp hızı 117 atım/dk, solunum sayısı 24 nefes/dk idi. Sol üst ekstremitede atrofi, cilt rengi değişikliği, duyu ve motor felç mevcuttu. Posteroanterior (PA) akciğer grafisinde sol klavikulanın kırık olduğu ve serbest parçanın toraksa doğru yer değiştirdiği görüldü. Hastaya Arbeitsgemeinschaft für Osteosynthesefragen (AO) tip 15.2B2 klavikula kırığı tanısı konuldu. Doppler ultrasonografide sol subklavian arter (SA) proksimalinde basıya bağlı akım kaybı olduğu görüldü. Aksiller, brakial, radial ve ulnar arterlerde akım izlenmedi. Hastanın yandaş hastalıklarının fazla olması ve genel durumunun kötü olması nedeniyle arter tıkanıklığının proksimal bölgesi olan omuz ekleminden dezartikülasyon yapıldı. Üç aylık takipte dolaşım bozukluğuna ilişkin başka bir semptom görülmedi. Bu olgu sunumunda geç tanı almış kırıklarının yıkıcı sonuçlara yol açabileceği vurgulanmaktadır. Travma cerrahları, hastanın durumuna bağlı olarak klavikula kırıklarının cerrahi tedavisini de ön planda düşünmelidir.

Anahtar sözcükler: Dezartikülasyon; klavikula kırıkları; kompresyon; vasküler komplikasyon.

Ulus Travma Acil Cerrahi Derg 2024;30(11):835-838 DOI: 10.14744/tjtes.2024.54829