



Contents lists available at ScienceDirect

## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

# Enterocutaneous fistula formation thirty years after a femoral neck fracture fixation with lag screws: A case report

Khosrow Najjari<sup>a</sup>, Mahdi Gouravani<sup>b</sup>, Reza Hajebi<sup>a</sup>, Hossein Zabihi Mahmoudabadi<sup>a,\*</sup>, Ehsan Rahimpour<sup>a</sup>

<sup>a</sup> Department of Surgery, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran

<sup>b</sup> School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

## ARTICLE INFO

### Article history:

Received 12 February 2021

Received in revised form 23 February 2021

Accepted 23 February 2021

Available online 25 February 2021

### Keywords:

Enterocutaneous fistula

Femoral neck fracture

Hip fracture

Hemicolectomy

Case report

## ABSTRACT

**INTRODUCTION AND IMPORTANCE:** As the population grows older, femoral neck fracture is becoming one of the prevalent cases in orthopedics, although this fracture can also happen in younger individuals following high energy traumas. Fixation with cancellous lag screws is one treatment option for femoral neck fractures, especially for young adults and relatively active older patients.

**CASE PRESENTATION:** In this case report, we describe a 52-year-old man referred with the formation of enterocutaneous fistula (ECF) in the surgery place for fixation of a femoral neck fracture 30 years prior to presentation.

**CLINICAL DISCUSSION:** Interpretation of CT scan images as well as findings of the performed laparotomy suggested that fixation procedure with screws was probably the main culprit for penetration of ileum. Subsequently, the removal of screws enabled the fistula to reach the surface of skin, which presented with fecal drainage. To eliminate fistula, we performed right hemicolectomy and ileocolic anastomosis for the case.

**CONCLUSION:** Since management of ECF remains among the most challenging problems for surgeons, this unique case report indicates the possibility for formation of such fistula following a fixation procedure in the hip joint area, even after thirty years and stresses on taking measures in order to prevent fistula formation caused by the prevalent procedures performed on the hip joint.

© 2021 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

As one of the most distressing and difficult to manage problems for general surgeons, an enterocutaneous fistula (ECF) is an anomalous connection between the gastrointestinal tract and the skin [1]. While this fistula's conventional definition only includes those originating from small and large bowels, other definitions contain fistula arising from regions like the esophagus, stomach, pancreas, and biliary tree [2,3]. Although ECFs can spontaneously stem from an underlying pathology like inflammatory bowel disease, diverticular diseases, radiation enteritis, perforated ulcers, trauma, and other causes of intra-abdominal inflammation, studies show that they mostly emerge as a postoperative complication secondary to abdominal surgeries with the ileum as the most common site of origin [4,5].

Currently, femoral neck fractures are prevalent injuries in the orthopedic context, mostly happening in the elderly following

low-energy traumas [6]. Nevertheless, this fracture can happen in younger patients with a much lower prevalence and mainly as a result of high-energy traumas [7]. The importance of early mobilization for decreasing complications and increasing patients' comfort and quality of life implies the treatment of choice to be operative in most cases [6,8]. Selection of specific surgical treatment options such as fixation with cancellous lag screws, sliding hip screws, hemiarthroplasty, and total hip arthroplasty is based on various characteristics of the patient and fracture itself [9,10].

In this paper, we report a rare case of a 52-year-old man who presented with right hip pain and purulent drainage from the site of scar anterior to the right hip joint related to a femoral neck fracture surgery 30 years ago that later has been revealed to be associated with an enterocutaneous fistula. This article has been reported in line with the SCARE 2020 criteria [11].

## 2. Case presentation

A 52-year-old man with a chief complaint of redness and pain in his right hip presented to our hospital's emergency department. He had a one-month history of pain and had developed erythema and purulent discharge from the anterior region of his right hip for

\* Corresponding author at: Department of Surgery, Sina Hospital, Imam Khomeini St., Tehran, 11367-46911, Iran.

E-mail address: [hzabihim@tums.ac.ir](mailto:hzabihim@tums.ac.ir) (H. Zabihi Mahmoudabadi).

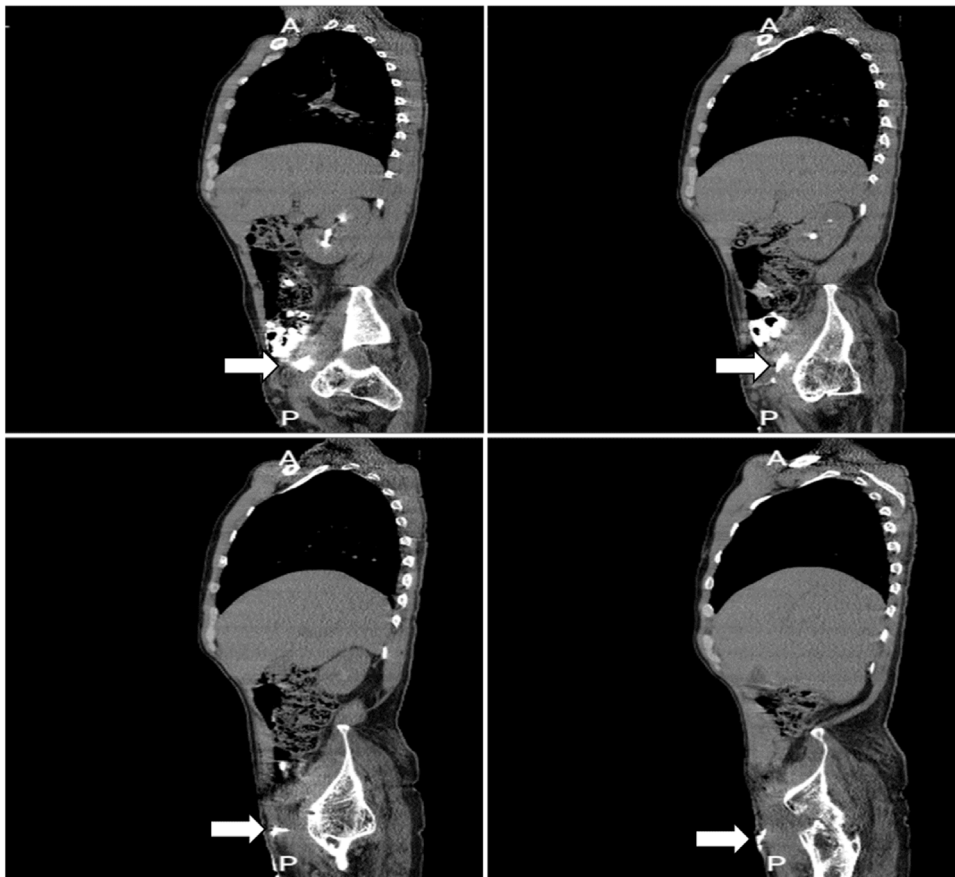


Fig. 1. Abdominopelvic CT scan images with IV and oral contrast after removal of screws. Leakage of contrast is recognizable (arrows).

the last 2–3 days. He had no fever, chills, or other constitutional symptoms. The patient underwent surgery 30 years ago following a femoral neck fracture, for which fixation with non-parallel lag screws was done. Other than this, he did not report any particular past medical and drug history, allergies, or relevant family history. In the physical examination, the range of motion in the right hip joint was limited. Tenderness, redness, and yellowish and foul-smelling purulent drainage have been observed at the place of scar related to previous surgical suture after the femoral neck fracture surgery.

He was transferred to the operating room with a diagnosis of surgical site infection by orthopedic surgeons where the screws were removed, and afterward, the wound has been irrigated and primarily closed. Osteomyelitis as an underlying cause was ruled out for the patient. The next morning after surgery, due to fecal discharge from the wound, surgical consultation by our department has been done.

In the physical examination, the patient's general condition was good, and he was not ill or toxic. His vital signs were stable, too. The fecal discharge was noticeable at the wound site. Furthermore, the abdomen was soft, and there was no sign of abdominal tenderness or distention. Rectal examination was normal. Anemia and raised levels of ESR and CRP have been detected in the patient's laboratory findings, which indicated inflammation. Rare gram-negative bacilli (*E. coli* and *Salmonella*) were found in the wound culture. In the abdominopelvic contrast-enhanced CT scan, disproportionate fat stranding, fluid collection, and increased thickness of soft tissue were detected in the subcutaneous region and the right iliacus, gluteus medius, and gluteus minimus muscles, along with a focus of air that could be suggestive of fluid collection. The delayed phase imaging showed leakage and extravasation of contrast from distal

loops of ileum in the pelvic area to the skin surface in the right thigh and hip joint area (Fig. 1).

Therefore, the patient was transferred to the general surgery department's operating room, and a surgical team led by an assistant professor of laparoscopic surgery conducted a laparotomy through a midline incision. In the initial exploration, the peritoneum was clean without any fecal matters or other types of contamination. There was an adhesion between the terminal ileum and the abdominal wall that has been removed. Moreover, a defect, approximately 2 cm in diameter, was recognized about 10 cm proximal to the ileocecal valve. The end loops of ileum with a rough length of 10 cm were entirely fused (Fig. 2). We successfully performed right hemicolectomy and ileocolic anastomosis for the patient, and he was transferred back to the ward. After surgery, he could tolerate per os nutrition and was discharged with a good general condition. At the three-month follow-up visit, the patient's wound was completely healed, and there were no wound infection symptoms.

### 3. Discussion

Enterocutaneous fistulas are yet amongst the most challenging problems for the surgical community [1]. Proper care of these patients requires timely and strict adherence to principles like identifying fistula, sepsis control, resuscitation, and nutritional management, and finally, definitive care that can be operative or non-operative [3,12]. This fistula's diagnosis generally depends on finding enteral contents such as fecal matter draining from the wound site and can be confirmed by contrast extravasation in the radiographic study [13].

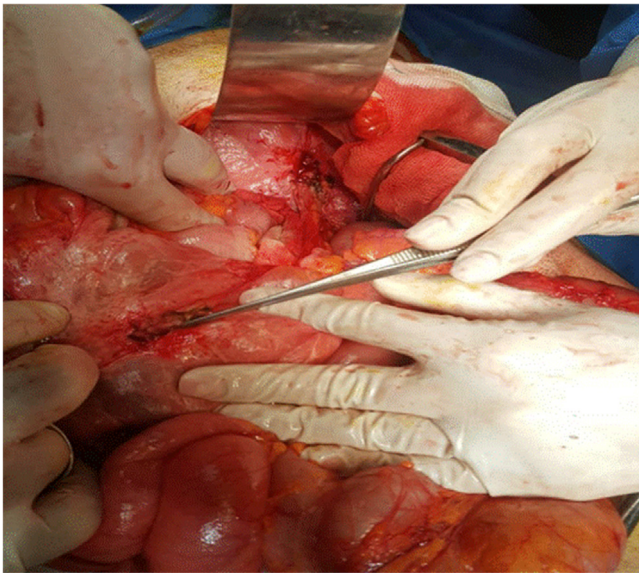


Fig. 2. Enteric fistula (pointed by surgical instrument).

The case reported in this paper is a 52-year-old man who presented with pain in his right hip as well as redness and yellowish purulent drainage from the anterior region of his right hip at the place of a scar resulting from a femoral neck fracture surgery that took place 30 years earlier. Initially, the patient was diagnosed with surgical site infection by our colleagues in the orthopedic department, and the screws applied for fixation of the mentioned fracture were pulled out in the operating room. Irrigation and primary closure had also been performed for the wound. However, a fecal discharge, indicative of an ECF, emerged from the wound site the next day. This diagnosis was confirmed by the abdominopelvic CT scan findings, such as disproportionate fat stranding and foci of air suggestive of fluid collection. More importantly, the delayed phase imaging revealed leakage of contrast from distal loops of the ileum, which reached the skin's surface anterior to the right hip joint.

Few studies report postoperative ECF formation following orthopedical surgeries like total hip arthroplasty, hip arthrodesis, arthroscopy, and axial lumbar interbody fusion [14–17]. Furthermore, a recent article indicates that surgery of proximal

femoral fractures (PFF), comprising femoral neck, intertrochanteric, and subtrochanteric fracture, is associated with the incidence of femoral arteriovenous fistula [18]; nonetheless, to the best of our knowledge, there is no report on ECF establishment after fixation procedures on a femoral neck fracture using lag screws. In a relatively similar case to ours, a 76-year-old patient had presented with a fistula between the hip and the caecum 39 years after arthrodesis of her hip with a Smith-Petersen nail [15]. In our case, interpretation of the right hip joint's radiologic images taken before removal of screws indicated no movement for screws after implementation (Fig. 3); thus, it seems that penetration of ileum had taken place during fracture fixation procedure. Supposedly, the penetrating screw itself had closed the puncture; therefore, the emergent fistula could not reach the skin. For an unknown reason that might be a slight movement of the screw or intestine, the fistula gained the ability to make a passage to the subcutaneous area that could be the underlying cause for infection, purulent drainage observed in the patient, and possibly a prior abscess formed at the fistula's opening. Eventually, removing the screws paved the way for the complete formation of an ECF with a demonstration of fecal matter. To eliminate fistula, we performed right hemicolectomy and ileocolic anastomosis for the case. After surgery, the patient's water-electrolyte balance and nutritional status were monitored closely to lower the risk of surgery complications, and he had no complications at discharge and three-month follow-up.

#### 4. Conclusion

Despite improvements in treatment guidelines and surgical care, ECF's successful management remains challenging, with a considerable mortality rate of 5–15% and high morbidity [19]. Fortunately, the management and the overall outcome of our case were desirable, and the patient was discharged with good general condition and tolerance of oral nutrition. Nevertheless, femoral neck fracture is also associated with considerable morbidity and mortality, and its prevalence is projected to be doubled by the year 2050 [20]. Therefore, this case report implicates that thorough scrutiny of different approaches toward treating this condition and their complications, which can be emerged even as late as 30 years, is of great significance. Moreover, general surgeons should be aware of the patients' past orthopedic procedures, particularly in the hip area, as the possible underlying cause for ECF.



Fig. 3. Pelvic X-ray before and after removal of screws.



## Declaration of Competing Interest

The authors report no declarations of interest.

## Sources of funding

None.

## Ethical approval

The study is exempt from ethnical approval in our institution.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Authors contributions

All of the authors contributed to the case study, research, and writing of the manuscript.

## Registration of research studies

Not applicable.

## Guarantor

Hossein Zabihi Mahmoudabadi, MD.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

## Acknowledgements

The authors wish to thank their colleagues at the Department of Orthopedics for valuable discussions and advice.

## References

- [1] W.P. Schechter, A. Hirshberg, D.S. Chang, H.W. Harris, L.M. Napolitano, S.D. Wexner, S.J. Dudrick, Enteric fistulas: principles of management, *J. Am. Coll. Surg.* 209 (October (4)) (2009) 484–491.
- [2] L.H. Edmunds Jr., G.M. Williams, C.E. Welch, External fistulas arising from the gastro-intestinal tract, *Ann. Surg.* 152 (September (3)) (1960) 445–471.
- [3] C.I. Haack, J.R. Galloway, J. Srinivasan, Enterocutaneous fistulas: a look at causes and management, *Curr. Surg. Rep.* 2 (10) (2014) 71.
- [4] J.L. Martinez, E. Luque-de-Leon, J. Mier, R. Blanco-Benavides, F. Robledo, Systematic management of postoperative enterocutaneous fistulas: factors related to outcomes, *World J. Surg.* 32 (March (3)) (2008) 436–443, discussion 444.
- [5] J.E. Mawdsley, P. Hollington, P. Bassett, A.J. Windsor, A. Forbes, S.M. Gabe, An analysis of predictive factors for healing and mortality in patients with enterocutaneous fistulas, *Aliment. Pharmacol. Ther.* 28 (November (9)) (2008) 1111–1121.
- [6] A.V. Florschütz, J.R. Langford, G.J. Haidukewych, K.J. Koval, Femoral neck fractures: current management, *J. Orthop. Trauma* 29 (March (3)) (2015) 121–129.
- [7] O. Johnell, J.A. Kanis, An estimate of the worldwide prevalence and disability associated with osteoporotic fractures, *Osteoporos. Int.* 17 (December (12)) (2006) 1726–1733.
- [8] J.W. Kim, S.E. Byun, J.S. Chang, The clinical outcomes of early internal fixation for undisplaced femoral neck fractures and early full weight-bearing in elderly patients, *Arch. Orthop. Trauma Surg.* 134 (July (7)) (2014) 941–946.
- [9] K. Bjørgul, O. Reikerås, Outcome of undisplaced and moderately displaced femoral neck fractures, *Acta Orthop.* 78 (August (4)) (2007) 498–504.
- [10] E.C. Rodríguez-Merchán, In situ fixation of nondisplaced intracapsular fractures of the proximal femur, *Clin. Orthop. Relat. Res.* (June (399)) (2002) 42–51.
- [11] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [12] A.R. Evenson, J.E. Fischer, Current management of enterocutaneous fistula, *J. Gastrointest. Surg.* 10 (March (3)) (2006) 455–464.
- [13] K.B. Cowan, S. Cassaro, Enterocutaneous fistula. 2020 Aug 10, in: StatPearls [Internet], StatPearls Publishing, Treasure Island (FL), 2020, Jan–.
- [14] J.S. Levin, A.A. Rodriguez, K. Luong, Fistula between the hip and the sigmoid colon after total hip arthroplasty. A case report, *J. Bone Joint Surg. Am.* 79 (August (8)) (1997) 1240–1242.
- [15] J.M. Kumar, R.L. Jowett, Fistula between the hip and the caecum, *J. Bone Joint Surg. Br.* 66 (August (4)) (1984) 603.
- [16] M. Goss, K. Weinheimer, R.A. Weinheimer, M.A. Schade, C.M. Davis 3rd, M.R. Garner, Septic arthritis of the hip and enterocutaneous fistula formation after hip arthroscopy: a case report of psoas abscess misdiagnosed as labral pathology, *JBJS Case Connect.* 9 (December (4)) (2019), e0505.
- [17] G. Siegel, N. Patel, R. Ramakrishnan, Rectocutaneous fistula and nonunion after Trans1 axial lumbar interbody fusion L5-S1 fixation: case report, *J. Neurosurg. Spine* 19 (August (2)) (2013) 197–200.
- [18] J.S. Kim, S.A. Lee, H.K. Chee, J.J. Hwang, H.Y. Kim, J.Y. Kim, S.M. Choi, H.Y. Kim, W.S. Lee, Femoral arteriovenous fistula associated with surgery of proximal femoral fracture: a systematic review of the literature and case presentation, *Ann. Transl. Med.* 8 (March (6)) (2020) 291.
- [19] R.M. Owen, T.P. Love, S.D. Perez, J.K. Srinivasan, J. Sharma, J.D. Pollock, C.I. Haack, J.F. Sweeney, J.R. Galloway, Definitive surgical treatment of enterocutaneous fistula: outcomes of a 23-year experience, *JAMA Surg.* 148 (February (2)) (2013) 118–126.
- [20] B. Gullberg, O. Johnell, J.A. Kanis, World-wide projections for hip fracture, *Osteoporos. Int.* 7 (5) (1997) 407–413.

## Open Access

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.