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Research Article

AFTER (Ankle Fracture Treatment Enhanced Recovery) Project: A Multi-Disciplinary and Cost Effective Approach to Improve Patient Outcome with Ankle Fractures

Rajib Naskar*, Gabriel Omogra, Nigel Katandawa, Baljinder Dhinsa

Department of Trauma & Orthopedics, East Kent Hospital University NHS Foundation Trust, United Kingdom

Abstract

Introduction: Ankle fractures often pose significant challenges to the healthcare system in United Kingdom. Increased soft tissue swelling together with limited theatre space lead to a delayed surgery and an increased hospital stay which causes poor outcome and decrease patient satisfaction. The aim of this project was to improve the decision making for unstable ankle fractures, reduce in-hospital stay and improve patient outcome.

Assessment of the problem: Initially, we retrospectively collected data from 2018-19 for all unstable ankle fracture who underwent surgery and we analysed the reasons for the delay in surgery, time from injury till surgery and measured outcome score.

We found out that 73.4% of ankle surgeries are getting delayed. The average stay in hospital for ankle fracture patient was about 4.5 days and the average delay in surgery was 3.4 days resulting in an estimated loss of £1,50,000 a year for delayed surgeries only.

Intervention: We implemented the AFTER pathway in 2019 to expedite the decision making for surgery and early physiotherapy input. If surgery is not possible immediately, the patient will be assessed by the IDT team and encouraged to go home with a leg elevator (OrthoLove) and clinic follow up in 72 hours for swelling as-sessment, the decision regarding the date and time of surgery. Finally, the surgery is done as a daycare admis-sion and then discharged with the elevation pillow. Post-surgery, a team of dedicated foot and ankle physiothe-rapist will guide these patients for early weight-bearing and rehabilitation and follow up in the clinic for 6 months.

Result: We measured the outcomes in terms of total in-hospital stay, time from ED presentation to surgery and post-surgery OMAS score at 6 months follow up. We have seen a significant reduction in hospital stay from 4.5 days to 1.4 days. And a reduction in healthcare cost without any increase in the complication rate. Patient satis-faction also increased significantly because of reduced hospital stay (average OMAS score 78).

Conclusion and significance: AFTER project is a dedicated and cost-effective pathway to treat unstable ankle fractures, however, structured rehabilitation and a multi-disciplinary team approach are essential for its success.

Keywords: Ankle fractures; Cost analysis; Day case; Patient satisfaction

Introduction

Treatment of unstable ankle fractures is often very challenging to manage and puts a significant economic constrain on the healthcare budget in the United Kingdom. It is one of the most common fractures treated surgically and represents at least 10% of all fractures. According to national guidelines, these fractures ideally should be treated within 12 hours of admission, if soft tissue conditions permits [1,2]. If not treated within the first 12 hours, it often gets delayed for days because of swelling or soft tissue conditions, leading to an increased hospital stay and a decrease in patient satisfaction and outcome. A number of studies found that delaying surgery increase the post-operative complication rate [3] and in-patient stay. All these factors put a huge economic constrain on the healthcare budget. Because of this, we initiated a project in our district general hospital to expedite or plan the surgery and reduce the in-hospital stay, improve patient-reported outcome and also functional outcome by proper rehabilitation and follow-ups.

Methodology

This project aims to improve the decision making for unstable ankle fractures, safety, reduce in-hospital stay and improve patient outcome. To assess the cause of the problem we pulled out clinical data from 2018 for all unstable ankle fracture that underwent surgery and we analyzed their medical notes for the time from injury till surgery, the reason for the delay in surgery, and finally their measured outcome score and functional outcome.

We analyzed data from 40 patients from 2018-2019 who had surgery for unstable ankle fractures. We found out that 73.4% of ankle surgeries are getting delayed of which 48.9% because of limited space in the trauma list and 44.6% because of soft tissue swelling. The average stay in hospital for ankle fracture patient

was about 4.5 days and the average delay in surgery was 3.4 days resulting in an estimated loss of £1,50,000 a year for delayed surgeries only.

Intervention

In the monthly quality governance meeting, we proposed this dedicated ankle fracture path-way which will aim towards improving the outcome of ankle fracture patients. It was agreed amongst the T&O consultants, ED consultants, physiotherapist and allied health profession-als.

We implemented the AFTER pathway in 2019, which essentially mandates clear documentation of mechanism if injury, neurovascular status and skin condition on initial presentation. After resuscitation, on the same day or next day morning (if out-of-hour presentation) the on-call consultant will decide on the date and time of surgery. If soft tissue condition permits, surgery will be done on the same day or next available trauma list (Figure 1).

If surgery is not possible immediately, the patient will be assessed by the IDT (intermediate discharge team), physiotherapy team. If they fulfil the discharge criteria (neurovascularly intact, medically stable, can manage themselves at home, able to mobilize non-weight bearing, someone to look after at home and to bring them back to the hospital).

Encouraged to go home with a leg elevation pillow (Ortholove™, Huntington, UK) and clinic follow up in 72 hours for swelling assessment, the decision regarding the date and time of surgery. Finally, the surgery is done as a daycare admission and discharged with an elevation pillow (Ortholove™, Huntington, UK). After surgery, a team of dedicated foot and ankle physiotherapist will guide these patients for early weight-bearing and rehabilitation and follow up in the clinic for 3 months. In their final follow up at 3 months final XR and outcome scores were taken (OMAS score).

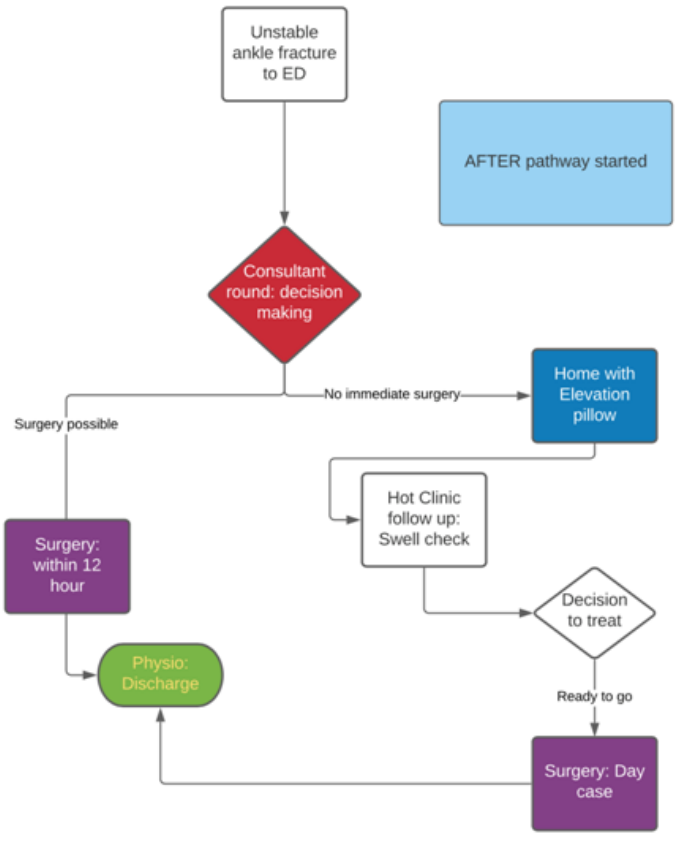

Figure 1: AFTER pathway in 2019.

Re-audit result

We did a re-audit after 6 months of starting the project. The outcome was measured in terms of total in-hospital stay for all unstable ankle fracture, time from ED presentation to surgery and post-surgery OMAS (Olerud-Molander Ankle Score). There was a slight female predominance with a female to male ratio 1.2:1, and most of the injuries were because of simple mechanism like twisting off the leg and fall etc. The average delay in surgery reduced to 2.1 days for patients with immediate surgery and 8.5 days for the patient going home with the pillow. We have seen a significant reduction in hospital stay from 4.5 days to 1.4 days. And a significant reduction in healthcare cost without any increase in the complication rate. There were only 2 cases of superficial skin infections compared to 5 superficial infections in the previous group. Patient satisfaction was quite high with an average OMAS score of 78, mainly because of reduced hospital stay and structured follow-ups.

Discussion

While making a new treatment protocol, as a clinician we should always consider minimal utilization of healthcare resources while maintaining highest standards of care and safety. Although the ideal time for ankle surgery is within 8 hours [6], within our limited resources it is often not possible to operate in this time frame. Once this opportunity is missed the ankle often gets swelled up resulting in delayed surgery. The AO group recommends that once delayed for swelling, the surgery should be postponed for at least 4-5 days to avoid soft-tissue complications and infections [7]. In this project, we tried to reduce the hospital stay by safely discharging this delayed surgery group and bring them back as a daycare case. Moreover with the recent outbreak of Covid 19 and lack of in-hospital beds and resources, more than ever this home-based treatment shows a promising way to utilize our limited resources properly. If the patient is going home, we provided them with a specifically designed leg elevator, which will help the swelling to come down. When the patient coming for the actual surgery, they will bring the elevator back to us. These reusable elevators cost around £125 each, and they are reusable and easy to maintain.

Murray *et al.* [8] showed in their study that home-based treatment is a cost-effective option for ankle fracture and provide a good outcome. Lloyd *et al.* [9] also showed in their paper that HBT (Home-based treatment) for ankle fracture is cost-effective and well received by the patients. Bullock *et al.* [10] showed that out-patient ankle surgery minimizes hospital admission and reduce the chances of nosocomial infection. James *et al.* [11] estimated in their paper that the cost of an acute bed in NHS to be £225 per person per day and that translate into an average cost of £990 per patients whose operation is getting delayed. In our project, we did a similar calculation and it showed that the average reduction in hospital stay from 4.5 days to 2.1 days for all the ankle fractures in the hospital over a year will save around £550 per person that comes to £1,50,000 a year for ankle fractures alone. In terms of

the swelling check, there was no need to book them in a separate clinic, they can be followed up by an on-call T&O team with plaster room nurses and at the same time, pre-operative screening and checkups could be done. Even after surgery, the patient will be seen by a nurse-led clinic for a wound check and the foot and ankle physiotherapist followed them up for 3 months. In our study, the average OMAS score was 78 which are similar to the study done by Nilsson *et al.*[12]. The reason for the suboptimal score after ankle surgery is found to be inappropriate rehabilitation and that is why in our project we incorporated physiotherapy follow up and rehabilitation for at least 6 months.

Limitations

The major limitation of this project was that we can only send patients home if they are fit enough and able to look after themselves. This was a prospective study where we followed up patients for 6 months, however long term data are awaiting and we think another audit of the project after a year would give more accurate picture.

Conclusion

AFTER project is a dedicated and cost-effective pathway to treat unstable ankle fractures.However, structured rehabilitation and a multi-disciplinary team approach are essential for its success. The outcome of this project shows reasonable clinical outcome at 6 months. Home based treatment not only reduces the hospital stay but also gives a better patient reported outcome. In recent times of Covid 19, when there are crisis of acute hospital beds, this program could be a valuable tool for acute fracture management.

Conflicts of Interest

Ortholove™ (LEDA orthopaedics, UK) has supported this project by providing 10 free leg elevators for the department of Trauma and Orthopaedics.

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Address of Correspondence: Rajib Naskar, Clinical Fellow, Department of Trauma & Orthopaedics, Department of Trauma & Orthopedics, William Harvey Hospital, East Kent Hospital University NHS Foundation Trust, United Kingdom, E-mail: rajib.naskar@nhs.net

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