Clinical Research

Prophylactic and Therapeutic Fasciotomy for Acute Compartment Syndrome after Revascularization for Acute Lower Limb Ischemia—Renal and Wound Outcomes

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Background: Acute Compartment Syndrome (ACS) is a significant complication after revascularization for acute lower limb ischemia (ALI). High risk patients sometimes undergo prophylactic fasciotomy (PF) to prevent ACS. Patients that develop ACS undergo therapeutic fasciotomy (TF). The optimal timing of fasciotomy has been debated. The aim of this study was to describe and compare renal and wound outcomes in patients undergoing PF and TF.

Methods: A retrospective cohort study including 76 patients undergoing PF (n = 40) or TF (n = 36) after revascularization for ALI between 2006 and 2018. Estimated glomerular filtration rate (e-GFR) was used to evaluate renal function and compare within (paired-samples t-test) and between (analysis of variance) groups. Wound complications and healing time were compiled from the complete wound healing period and compared between groups with Pearson’s chi-squared- and log-rank test, respectively.

Results: E-GFR improved over the in-hospital period with 8.2 ml/min/1.73 m² (95% confidence interval [CI] 2.4—14.1, P = 0.007) in the PF group and 4.4 ml/min/1.73 m² (95% CI 1.2—7.7, P = 0.010) in the TF group, with no significant difference between the 2 groups (0.3 ml/min/1.73 m², 95% CI –6.7 to 7.4, P = 0.93). The wound infection rate was higher after TF (PF = 60.6 % and TF = 82.4 %, P = 0.048), whereas rate of other wound complications (PF = 61.3 % and TF = 35.3%, P = 0.036) was higher after PF.

Conclusions: Overall wound complications were high, whereas renal function improved during in-hospital stay. A more conservative approach to fasciotomy could avoid unnecessary fasciotomies and reduce wound complications, while holding the potential to sufficiently preserve renal function if fasciotomy is needed for ACS. This would be possible and safe if an early diagnosis and treatment of ACS can be ensured.

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INTRODUCTION

Acute lower limb ischemia (ALI) is caused by sudden onset of reduced blood flow to the limb. It is usually a result of thrombosis, which may develop in atherosclerotic and aneurysmatic arteries, or embolism from the heart, obstructing arteries supplying the limb. Depending on the severity of ALI, the limb can be salvaged through urgent revascularization, performed either through open vascular surgery, endovascular procedures, or hybrid vascular surgery. After revascularization, the limb muscles may swell due to inflammation and endothelial injury.

The muscles are contained in compartments enclosed by fascia and can only expand to a certain degree. Acute compartment syndrome (ACS) develops if the muscle cannot sufficiently expand within the compartment, thus increasing intracompartmental pressure (ICP) with constriction of blood flow. The ischemia from ACS alone is limb threatening, while it also causes rhabdomyolysis resulting in release of certain toxic metabolites, such as myoglobin, into the circulation. Myoglobin is excreted through the urine, but an excessive amount can lead to acute kidney injury (AKI).

In addition to the threat of renal injury from rhabdomyolysis, patients who develop ALI often have diabetes mellitus and often undergo contrast-enhanced imaging with nephrotoxic iodine contrast before and during treatment, all of which could contribute to renal injury.

The only curative treatment of severe ACS is a fasciotomy, a procedure which entails incisions along the fascia to relieve the ICP, thereby allowing the muscle to expand. If ACS is expected, a prophylactic fasciotomy (PF) can be performed. This will potentially protect against ACS and prevent additional limb ischemia. If ACS has already developed, a therapeutic fasciotomy (TF) must be performed.

While there may be intuitive reasons for performing a PF to prevent ACS, the vast majority of patients who undergo revascularization for ALI will not develop ACS. Fasciotomies are associated with a wide range of complications and should not be performed on dubious indications. It is however possible that a PF could protect against adverse events caused by ACS, such as renal injury, amputation, and neuromuscular sequelae. The environment in the muscle after development of ACS is characterized by a high degree of proinflammatory cytokines, cellular debris from necrotic cells including oxygen free radicals, and damaged endothelium with high permeability.

and inflammatory environment could be hostile to wound healing and a breeding ground for infections. A PF could prevent ACS and thereby potentially have a lower rate of wound complications and heal faster than a TF. Previous studies comparing amputation rates after PF and TF have shown conflicting results regarding a 30-day amputation outcome, which makes it difficult to determine if a PF is beneficial in practice, and if so, in what patient groups.

It is unknown if a PF can be limb- or life-saving, protect against neuromuscular sequelae and renal injury, and if it is associated with fewer complications than a TF. Therefore, the aim of this study is to describe the change in renal function and frequency of wound complications, and to examine potential differences in renal and wound outcomes between patients who undergo PF and TF after revascularization for ALI.

METHODS

Study Design and Setting

This study is a retrospective observational study of patients with ALI between 2006 and 2018 at a tertiary referral vascular center with an estimated catchment population of 1.9 million inhabitants in 2021.

Study Population

ALI was defined as any acute onset of lower-limb threatening ischemia with a maximum duration of 14 days. All patients who underwent revascularization procedures for ALI between 2001 and 2018 were entered in a register. Patients who were treated primarily conservatively, with primary amputation of the limb or with palliative care were excluded. In total, 843 revascularizations were included in the register, of whom 76 underwent fasciotomy between 2006 and 2018. The study center joined a new patient record system on a digital platform in January 2006, which simplified data collection, and 2006 was therefore chosen as starting point of this study.

Procedures for Revascularization

The patients underwent either primary open vascular surgery or endovascular procedures as treatment for ALI. Primary open vascular surgery included open thrombo-embolectomy or bypass surgery. Endovascular procedures were predominantly catheter-directed thrombolysis (CDT). CDT was sometimes followed by adjunctive transluminal
angioplasty, and/or deposition of stents and/or stent grafts.

**Fasciotomy Definition and Wound Treatment**

PF was any fasciotomy performed prior to signs of ACS, otherwise it was categorized as a TF.

When fasciotomy was performed, a four-compartment fasciotomy was usually chosen. The fasciotomy wounds were dressed using negative pressure wound therapy (NPWT) or compresses and gauze dressings. NPWT was started at the time of fasciotomy or the following day, after wound revision or when it was deemed necessary. A black poly urethane or white polyvinyl alcohol sponge (KCI Medical, San Antonio, Texas, USA) was applied with a topical continuous negative pressure of 125 mm Hg. Changes of NPWT dressings were usually performed 3 times per week. The first redressings were sometimes performed at the operating room. In addition to NPWT, reduction of edema in the fasciotomy wound was treated by positioning the leg above heart level (approximately 10 cm), physiotherapy program including concentric activity of calf muscles and use of intermittent pneumatic compression of the calf and feet. Staged interrupted skin suturing was performed when needed for closure of the skin edges. Sometimes split skin graft transplant was needed to cover the wound bed to promote wound healing. NPWT using white polyvinyl alcohol sponge on top of a fresh split skin graft transplant was sometimes used to improve graft take.14

**Baseline Comorbidity Prior to Admission**

Ischemic heart disease was defined as any prior history of myocardial infarction or invasive treatment for angina pectoris. Atrial fibrillation was defined by previous history, evidence from electrocardiogram or echocardiography. Previous claudication was defined by a history of claudication in the affected limb prior to onset of ALI. Diabetes mellitus was defined by having a diagnosis of diabetes mellitus, type 1 or type 2, prior to hospitalization for ALI. Current smoker was defined by being a regular smoker at admission, or cessation within a 1-year period prior to admission. Previous smoker was any patient with a history of regular smoking with a cessation date more than 1 year prior to admission. Hypertension was defined by the usage of antihypertensive drugs, or a prior diagnosis of hypertension. Dialysis prior to admission was defined by undergoing dialysis regularly for chronic renal failure.

**Patient Symptoms and Findings at Admission**

Anemia was present if blood-hemoglobin was lower than 134 mg/L in male and 117 mg/L in female patients. Renal insufficiency was defined as a relative estimated-glomerular filtration rate (e-GFR) of less than 60 ml/min/1.73 m² at admission. The severity of the ischemia was ranked according to Rutherford’s Criteria, where presence of motor deficit was labelled as Rutherford IIb.15

**Renal Function**

The e-GFR was calculated using an established formula based on patients’ serum-creatinine levels, age, and sex.16 Serum-creatinine values during in-hospital stay period were collected at admission, when highest and at discharge. Dialysis following revascularization was defined as any new onset of dialysis during the in-hospital period after revascularization.

**Wound Outcomes**

Major amputation was defined as amputation at tibial level or proximal thereof. Wound infection was assessed according to the Centers for Disease Control and Prevention (CDC) classification.17 Other wound complications were skin necrosis, significant bleeding, and wound rupture. Healed fasciotomy was accomplished when there was full skin epithelialization of every eligible fasciotomy wound. Reduced motor function was defined as peroneus paresis, any sign of new onset of reduced motor function, need of physiotherapy, or new need of walking aid at discharge.

**Data Sources**

Data regarding patient characteristics, laboratory data, status at admission, and outcome were collected from medical records. The records are linked to each patient’s unique social security number in Sweden. Patients with open fasciotomy wound were regularly followed up at the vascular outpatient clinic until complete wound healing. Uncomplicated procedures were followed up once at 30 days and 1 year post discharge. Additional follow-up was only performed when necessary. If needed, fasciotomy wound treatment was performed at the vascular center outpatient clinic and rarely at primary care facilities. Data from primary care facilities were not included. Data on patients who returned to hospitals outside of the local municipality after initial treatment of ALI were usually retrieved by receiving copies of patient records upon
request. Information regarding survival and date of death were collected from the National Population Registry.

**Sample Size**

Consecutive patients identified during the study period that met the inclusion criteria were included. No estimations of sample size were performed due to the exploratory aim.

**Statistical Analysis**

The statistical analysis was performed using SPSS, version 27 and 28 (IBM, Armonk, New York, USA). Nominal data was expressed in proportions and compared between groups using Pearson’s chi-squared test. Continuous data that was not normally distributed were expressed in median and interquartile range. Normally distributed data was expressed with mean and standard deviation. The difference in e-GFR at the 3 time points during the in-hospital stay between the PF and TF group was analyzed using analysis of variance (ANOVA), adjusting for sex and Rutherford IIb. To analyze the change in e-GFR in between 2 different time-points from admission to discharge in the PF and TF groups paired samples, the t-test was used. The mean change in e-GFR from admission to discharge was compared between the PF and TF groups using univariate ANOVA, adjusting for e-GFR at admission, Rutherford IIb, and sex. Potential confounders were included in the model if inclusion resulted in a change in results of more than 15%. Comparison of complete wound healing time of fasciotomies between PF and TF was performed using Kaplan–Meier survival analysis with life tables, and difference between groups with the log-rank test. A P-value of less than 0.05 was considered significant.

**Ethical Considerations**

Ethical approval was granted by Swedish Ethical Review Authority (Dnr 2020/00,764).

**RESULTS**

**Patient Characteristics**

In the PF group 37.5% were female, 35.3% were smokers, 17.5% had diabetes, 66.7% had renal insufficiency at admission, and 2.6% routinely underwent dialysis. In the TF group 25% were female, 22.9% were smokers, 25.0% had diabetes, 44.4% had renal insufficiency at admission, and 0% routinely underwent dialysis (Table I).

**Patient Symptoms and Findings**

In the PF group, the median symptom duration was 13.5 hrs from onset to the start of the treatment, in comparison to a median of 48.0 hrs in the TF group. Motor deficit (Rutherford IIb) was found in 92.5% of patients in the PF group and 58.3% in the TF group. Primary open vascular surgery was chosen for 100% of patients in the PF group and 36.1% of patients in the TF group (Table II).

**Renal Outcomes**

The PF (8.2 mL/min/1.73 m², 95% CI 2.4–14.1, P = 0.007) and TF (4.4 mL/min/1.73 m², 95% CI 1.2–7.7, P = 0.010) -groups had both improvements of e-GFR from admission to discharge (Fig. 1), (Table III), with no observed difference.

| Characteristic                              | All (n = 76) | Prophylactic fasciotomy (n = 40) | Therapeutic fasciotomy (n = 36) |
|---------------------------------------------|-------------|---------------------------------|--------------------------------|
| Age, mean (SD) (n = 76)                    | 71.6 (11.7) | 72.3 (10.7)                     | 71.0 (11.3)                    |
| Female % (n = 76)                           | 31.6 (24)   | 37.5 (15)                       | 25.0 (9)                       |
| Smoking % (n = 69)                          | 29.0 (20)   | 35.3 (12/34)                    | 22.9 (8/35)                    |
| Previous smoking % (n = 69)                 | 37.7 (26)   | 38.2 (13/34)                    | 37.1 (13/35)                   |
| Hypertension % (n = 76)                     | 77.6 (59)   | 75.0 (30)                       | 80.6 (29)                      |
| Anemia % (n = 73)                           | 17.8 (13)   | 23.1 (9/39)                     | 11.8 (4/34)                    |
| Diabetes mellitus % (n = 76)                | 21.1 (16)   | 17.5 (7)                        | 25.0 (9)                       |
| Atrial fibrillation % (n = 76)              | 34.2 (26)   | 37.5 (15)                       | 30.6 (11)                      |
| Ischemic heart disease % (n = 76)           | 35.5 (27)   | 30.0 (12)                       | 41.7 (15)                      |
| Previous claudication % (n = 76)            | 40.8 (31)   | 37.5 (15)                       | 44.4 (16)                      |
| Renal insufficiency % (n = 75)              | 56.0 (42)   | 66.7 (26/39)                    | 44.4 (16/36)                   |
| Dialysis prior to admission % (n = 73)      | 1.4 (1)     | 2.6 (1/38)                      | 0.0 (0/35)                     |

SD, standard deviation.
between the 2 groups (0.3 mL/min/1.73 m², 95% CI –6.7 to 7.4, P = 0.93) regarding improvement. There were neither significant differences between the 2 groups regarding e-GFR at the 3 different time points, nor for the need of new-onset dialysis-treatment following revascularization (Table IV).

Wound Outcomes
The fasciotomy wounds were completely healed in a higher proportion in the TF group (PF = 57.5% vs. TF = 80.6%, P = 0.031). NPWT was applied more frequently to the TF group (PF = 38.9% vs. TF = 63.9%, P = 0.034). The combined wound complication rates were high in both groups (PF = 78.8% vs. TF = 91.2%, P = 0.16) but with no significant difference. The infection rate was overall high (71.6%) and higher in the TF-group than the PF-group (PF = 60.6% vs. TF = 82.4% P = 0.048). The PF group had a higher rate of other wound complications (PF = 61.3% vs. TF = 35.3% P = 0.036). There were no significant differences regarding total wound complications, wound healing time (Fig. 2), wound revisions done in the operating room, readmission for wound complications, or any other wound outcome (Table V).

Short-Term Major Amputation and Mortality
The combined major amputation/mortality rate at 90 days was borderline-significantly higher in the PF group (PF = 37.5% vs. TF = 17.1%, P = 0.050). The mortality rate at 90-days did not differ significantly (PF = 10.0% vs. TF = 5.7%, P = 0.50), nor did the amputation rate at 90-days (PF = 17.5% vs. TF = 8.6%, P = 0.26) (Table VI).

DISCUSSION
Renal function improved in both groups over the in-hospital period with no significant difference in improvement between the 2 groups. High rates of wound complications, predominantly wound infections, were found in both PF and TF groups. A fasciotomy was also associated with a long median wound healing time, over 2 months in both groups.

The improvement in renal function from admission to discharge can be counterintuitive. Initial kidney injury could be explained by hypovolemia and ischemia-induced rhabdomyolysis.21 Other potential risks for renal injury during the in-hospital period would be multiorgan failure from systemic inflammatory response syndrome or septicemia. Even with the exposure to iodine contrast and risk of rhabdomyolysis from muscle ischemia, renal function was, after an initial ischemia-reperfusion insult, not worsened in either group in the present study. This suggests that a TF, in most cases, is not associated with permanent renal injury. It is important to note, though, that 2 patients in each group developed severe renal injury with need of

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**Table II.** Patient symptoms and findings prior to intervention and management

| Characteristic                              | All (n = 76) | Prophylactic fasciotomy (n = 40) | Therapeutic fasciotomy (n = 36) |
|---------------------------------------------|-------------|----------------------------------|-------------------------------|
| Symptom duration (hr), median (IQR) (n = 75) | 18.5 (6.8–48.0) | 13.5 (6.0–45.0) | 48.0 (14.0–120.0) |
| Ankle-brachial index, median (IQR) (n = 49)  | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) |
| Rutherford class IIb % (n = 76)             | 76.3 (58)   | 92.5 (37) | 58.3 (21) |
| CT-angiography pre intervention % (n = 76)   | 51.3 (39)   | 50.0 (20) | 52.8 (19) |
| Bilateral arterial occlusions % (n = 76)     | 17.1 (13)   | 25.0 (10) | 8.3 (3) |
| Suprainguinal occlusion % (n = 76)           | 34.2 (26)   | 42.5 (17) | 25.0 (9) |
| Native artery thrombus % (n = 76)            | 23.7 (18)   | 32.5 (13) | 13.9 (5) |
| Native artery embolus % (n = 76)             | 27.6 (21)   | 35.0 (14) | 19.4 (7) |
| PAA occlusion % (n = 76)                     | 17.1 (13)   | 15.0 (6) | 19.4 (7) |
| Primary open vascular surgery % (n = 76)     | 69.7 (53)   | 100.0 (40) | 36.1 (13) |
| CDT % (n = 76)                               | 28.9 (22)   | 0.0 (0) | 61.1 (22) |
| Other endovascular procedure % (n = 76)      | 1.3 (1)     | 0.0 (0) | 2.8 (1) |

CDT, Catheter directed thrombolysis; CT, Computed tomography; IQR, Inter quartile range; PAA, Popliteal artery aneurysm.
temporary dialysis, showcasing the impact of ALI, potentially resulting in severe deterioration of renal function irrespective of ACS or not.

The TF group had more wound infections but a lower rate of other wound complications. Muscle necrosis might be widely prevalent in the TF group, potentially caused by a longer ischemia time in general and, importantly, subsequent development of ACS. This could make the TF group more susceptible to infections. On the other hand, a PF done at the time of revascularization would expose a muscle that had recently been under severe ischemic insult. Additionally, the muscle may remain ischemic if the revascularization procedure was not entirely successful. The wound infection rate in the present study was overall 71.6%, which is more than twice the rates seen in 2 previous studies. This difference may be attributed to the documentation of wound complications until healed wound in the present study, compared to either a 30-day or an unclear follow-up time. The wide definition of wound infection, including all patients who received antibiotic treatment for suspected fasciotomy wound infection might overestimate the true number of wound infections. This might be caused by a low threshold for antibiotic treatment for suspected fasciotomy wound infections by the treating physician, especially in an outpatient setting where active surveillance of the wound is difficult. Nevertheless, the criteria of surgical site infection according to CDC classification guidelines, the most established and widely used definition, was used. In contrast, a previous study failed to find any significant difference between rates of wound infections after PF versus TF, with a somewhat higher observed rate of wound infection in the PF-group. All things considered, patients undergoing treatment for ALI often have multiple comorbidities, high age,

**Table III. Development of e-GFR over in-hospital period**

| Group                        | Admission e-GFR, mean (SD) | Discharge e-GFR, mean (SD) | Change in e-GFR, mean (95% CI) | P-value |
|------------------------------|----------------------------|----------------------------|--------------------------------|---------|
| All n = 69                   | 56.6 (SD: 23.1)            | 63.0 (SD: 24.0)            | 6.4 (95% CI: 3.0–9.8)          | <0.001  |
| Prophylactic fasciotomy n = 36 | 53.8 (SD: 26.5)            | 62.0 (SD: 28.1)            | 8.2 (95% CI: 2.4–14.1)         | 0.007   |
| Therapeutic fasciotomy n = 33 | 59.8 (SD: 18.7)            | 64.2 (SD: 18.8)            | 4.4 (95% CI: 1.1–7.7)          | 0.010   |
| Difference in change in e-GFR between PF and TF | 0.3 (95% CI: −6.7 to 7.4) | 0.93                      |

CI, confidence interval; eGFR, estimated glomerular filtration rate ml/min/1.73 m²; SD, standard deviation.

aAdjusted for sex, motor deficit and admission e-GFR.
reduced limb circulation, 2 large wounds with a long healing time, and possibly necrotic tissue underneath. With all these risk factors it is not unreasonable to think that wound infection rates over the whole wound healing period would be high, and potentially as high as this study suggests.

Fasciotomies results in large wounds on both sides of the lower leg, resulting in wound healing periods of over 2 months, and an SSI could arise at any point during that period. NPWT of fasciotomy wounds has shown greater daily wound size reduction, fewer dressing changes, shorter wound closure time, shorter hospital stay, and less resource use in retrospective studies comparing NPWT with gauze dressings. The present study results indicate, however, that irregular use of NPWT resulted in high wound complication rates in both the PF and TF group. To optimize fasciotomy wound care, a bundle of care approach appears to be necessary. This may include wound care primarily by the surgeon who performed the fasciotomy, meticulous wound revisions to remove necrotic muscle and skin tissue, regular NPWT dressing changes, secondary wound suture closure as soon as it is possible, and use of proper oral antibiotics after sampling of targeted wound cultures and testing of bacterial resistance.

A shorter time to full skin epithelialization would reduce the time window for the development of SSI. One randomized controlled trial (RCT) on deep groin infections after vascular surgery suggested that NPWT improved wound healing with significantly shortened time to full skin epithelialization, without an increased cost or loss in quality-of-life measures. A meta-analysis has suggested that fasciotomy wounds treated primarily with NPWT had low rates of wound complications but failed to promote healing without the need of split skin grafts compared to different primary closure techniques.

A few major differences between the PF and TF groups make comparison regarding major amputation and mortality difficult. One obstacle is the difference in revascularization procedures between the 2 groups, with only primary open surgery in the PF group and mainly CDT in the TF group. Though an updated meta-analysis has not concluded that either method is superior in terms of limb salvage and/or death, whereas the risk of major bleeding and distal embolization was found to be higher after CDT. Additionally, the PF group had a higher proportion of motor deficit (Rutherford IIb) at admission, indicative of severe ischemia. Far from all patients with ALI and motor deficit undergo PF, therefore something persuaded the surgeon to opt for a fasciotomy, potentially

| Table IV. Comparison of eGFR at different time points, change in eGFR and new onset dialysis | | |
| --- | --- | --- |
| Timepoint | All (n = 76) | Prophylactic fasciotomy (n = 40) | Therapeutic fasciotomy (n = 36) | Mean difference between groups | P-value |
| eGFR admission, mean (SD) (n = 75) | 56.6 (SD: 23.2) 53.3 (95% CI: 43.8–62.8) | 59.4 (95% CI: 51.1–67.7) (n = 39) | 54.4 (95% CI: 45.4–53.4) (n = 36) | −6.1 (95% CI: −17.8 to 5.5) (n = 39) | 0.30 |
| eGFR lowest point, mean (SD) (n = 75) | 44.4 (SD: 23.6) 43.6 (95% CI: 33.8–53.3) | 45.7 (95% CI: 37.2–54.3) (n = 39) | 44.4 (95% CI: 35.4–53.5) (n = 36) | −2.2 (95% CI: −16.5 to 9.1) | 0.72 |
| eGFR discharge, mean (SD) (n = 75) | 60.8 (95% CI: 50.3–71.2) | 64.4 (95% CI: 55.4–73.5) (n = 36) | 62.8 (95% CI: 53.4–72.2) (n = 36) | −3.7 (95% CI: −5.3 to 1.8) | 0.57 |
| New onset temporary dialysis % (n = 71) | 5.6 (SD: 23.6) | 5.6 (SD: 23.6) | 5.6 (SD: 23.6) | 0.98 |

CI, confidence interval; eGFR, estimated glomerular filtration rate ml/min/1.73 m²; SD, standard deviation. *Adjusted for sex and motor deficit in comparison between PF and TF.
anticipating a high risk of a poor outcome. This could explain the borderline higher rate of combined major amputation and mortality at 90 days, and the lower proportions of healed fasciotomies, in the PF group. If ACS is a result of successful revascularization of a limb, a TF would be a proxy for this, giving a better chance of short-term limb patency. On the other hand, the TF group did develop ACS which resulted in subsequent ischemia to the limb, especially worsening limb status in a group that nonetheless had significant proportion of motor deficit at admission.

The main limitations of this study were the retrospective design, the major differences between the 2 groups and the low sample size. The major amputation rate at 30 days was twice as high in the PF group compared to the TF group, but insignificantly higher, which may be attributed to a type II statistical error. With the retrospective design, the only data available was data that had already been recorded. This introduced the need for interpretation of available data, and acceptance of lack of data. The low numbers made it difficult to adjust for multiple confounders and it increased the risk of false associations, and lack of evidence for actual associations, though some adjustments of confounding factors were included when evaluating differences in renal function between PF and TF groups. There may also be censoring of cases affecting both the development of e-GFR and wound complications. For example, this would be the case if severe renal injury contributes to a higher mortality risk prior to discharge and thus censoring patients with negative development of e-GFR. At 30-days post revascularization, 4 and 4 patients had died in the PF and TF group respectively. Likewise, if major amputation or mortality occurred prior to any wound complication, the patient was censored. This would have resulted in an underestimation of complications, mainly in the PF group, as the PF group had a higher loss of data due to these severe adverse events and it can be presumed that the patients with poor outcome would have had a high risk of wound complications.

The study population consisted of consecutive patients at this center, from a 13-year data collection period, and the results of this study may be applicable to centers with a full range of facilities to manage patients with emergent vascular diseases. Larger prospective multicenter studies would be
warranted to be able to adjust for all confounders in the comparison between PF and TF, since a RCT comparing PF and TF in patients revascularized for ALI would be unethical. Prospective studies are also warranted to accurately determine the rates and extent of neuromuscular sequelae, as this factor is usually poorly described in patient records.

To reduce the number of wound complications, a conservative approach to fasciotomy would be beneficial, where fasciotomy is done only when ACS is emerging. An early diagnosis would offer the highest chance to mitigate the effects of the ACS-induced ischemia. The European Society for Vascular Surgery guidelines suggest that a fasciotomy should be performed preferably within 2 hrs of the development of ACS and no later than 6 hrs. Irreversible damage due to ACS can develop within hrs. As of now diagnosis of ACS is primarily a clinical diagnosis. The signs for ACS are either unspecific or late presenting, which could prolong the time to diagnosis and fasciotomy. Invasive measurement of the ICP is possible, but it is not routinely used to diagnose ACS after revascularization for ALI. A potential risk with invasive measurements is bleeding complications, with the risk of causing or worsening ACS, especially when done in conjunction to CDT. Novel noninvasive techniques for detection of ACS have shown early promise but are still under development. For a safe conservative approach to fasciotomy, introduction of noninvasive surveilling techniques for early diagnosis of ACS are needed.

### CONCLUSION

A fasciotomy, whether prophylactic or therapeutic, was associated with alarmingly high rates of wound infection and other wound complications. It was also associated with a long-wound healing time.
TF appears to have the potential to sufficiently preserve renal function caused by ACS. A conservative approach to the performance of fasciotomies, defined by active surveillance of the limb and performance of a fasciotomy only when ACS develops, could both be beneficial and reduce the number of unnecessary fasciotomies. This would warrant noninvasive monitoring of the limb for early diagnosis of ACS, which is not yet in practice.

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