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Case Series

Gluteus maximus transfer and mass graft (Capsulorraphy) in recurrent hip dislocation with the history of total hip replacement: A case series

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ABSTRACT

INTRODUCTION: Post THR dislocation has been a significant complication that interferes with the patient's life. Detection of risk factors, careful planning, proper operative procedures, and patient education is essential to prevent the incidence of dislocation. Several operative measures have been studied to achieve this, including the use of mesh for soft tissue procedures and capsulorraphy.
CASE PRESENTATION: A total of four patients is included in this case series. Two had a history of trauma that contributes to the necessity of the procedure while the other two had degenerative joint issues. All were operated by soft tissue procedure of gluteus maximus transfer as an abductor replacement and along with capsule augmentation using synthetic mesh as a synthetic capsule to strengthen and provide more stability.
DISCUSSION: The abductor strength from this gluteus maximus procedure is sufficient to stabilize the pelvis and prevent pelvic sag. The primary material of the mesh should produce inflammatory reaction so that a fibro capsular structure is formed surrounding the hip joint to add stability.
CONCLUSION: The use of mesh in soft tissue procedures, such as capsulorraphy, with the addition gluteus maximus transfer may assist to prevent (re)dislocations of the hip. However, further study should be conducted to validate the routine use of mesh and gluteus maximus transfer to prevent dislocation after the procedure.

1. Introduction

Dislocation after a total hip replacement (THR) procedure remains a significant complication as it is considered typical and interferes with the patient's daily activities. Several risk factors that may contribute to the dislocation of the hip joint have been identified, e.g. older patients (aged >70), medical comorbidities, female sex, joint laxity, revision surgery, abductor issues, patient education, etc. [1,2]. A meta-analysis performed in 2016 also mentioned operator / technical factors that may cause dislocation of the hip. This includes the femoral head diameter, number of revisions, and acetabular components with elevated rim liner [3].

Various approaches have been performed to prevent dislocation after THR. An approach using metal mesh to reconstruct acetabular defects has been utilized. Loss of acetabular bone may cause the fixation to be unsecured, therefore, increasing the risk of dislocations [4,5]. Impaction of allogenic bone graft whether in the medial or lateral side of the acetabulum alongside the use of mesh might help in reducing the chances of dislocation as it assists the reconstruction of the hip rotation center. However, hip joints with a rim or lateral segmental defect may require another reconstructive procedures [5].

Here we present a case series of four patients treated with soft tissue procedures with mesh to increase the stability and coverage of the hip joint, as an effort to prevent dislocation and to treat recurrent dislocations after the THR procedure. This case series has been reported in line with the PROCESS Guideline [6].

2. Case presentation

A total of four patients is included in this case series, which all were treated with mesh to augment the soft tissue surrounding the hip joint. All patients are female, with ages ranging from 19 to 73 years old. Two had a history of trauma that contributes to the necessity of the procedure while the other two had degenerative joint issues. One patient (SAg) underwent multiple post-THR dislocation and was treated with open reduction. All patients were treated with

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Table 1
List of patients included in this case series.

Patient	Initial Diagnosis (before THR)	Last Diagnosis
SAg, F, 19	Left dysplastic hip due to neglected left femoral neck fracture	Recurrent posterior dislocation of left THR post closed reduction, gluteus maximus posterior bundle transfer to lateral aspect with mesh and immobilization using skin traction
Bar, F, 73	Osteoarthritis of the hip	Recurrent THR dislocation of right hip with history of open reduction post soft tissue release and skeletal traction
TMi. F, 62	Osteoarthritis of the hip	Recurrent anterior dislocation of the left hip post left THR post closed reduction
War, F, 45	Periprosthetic infection of the hip post THR	Recurrent dislocation of THR

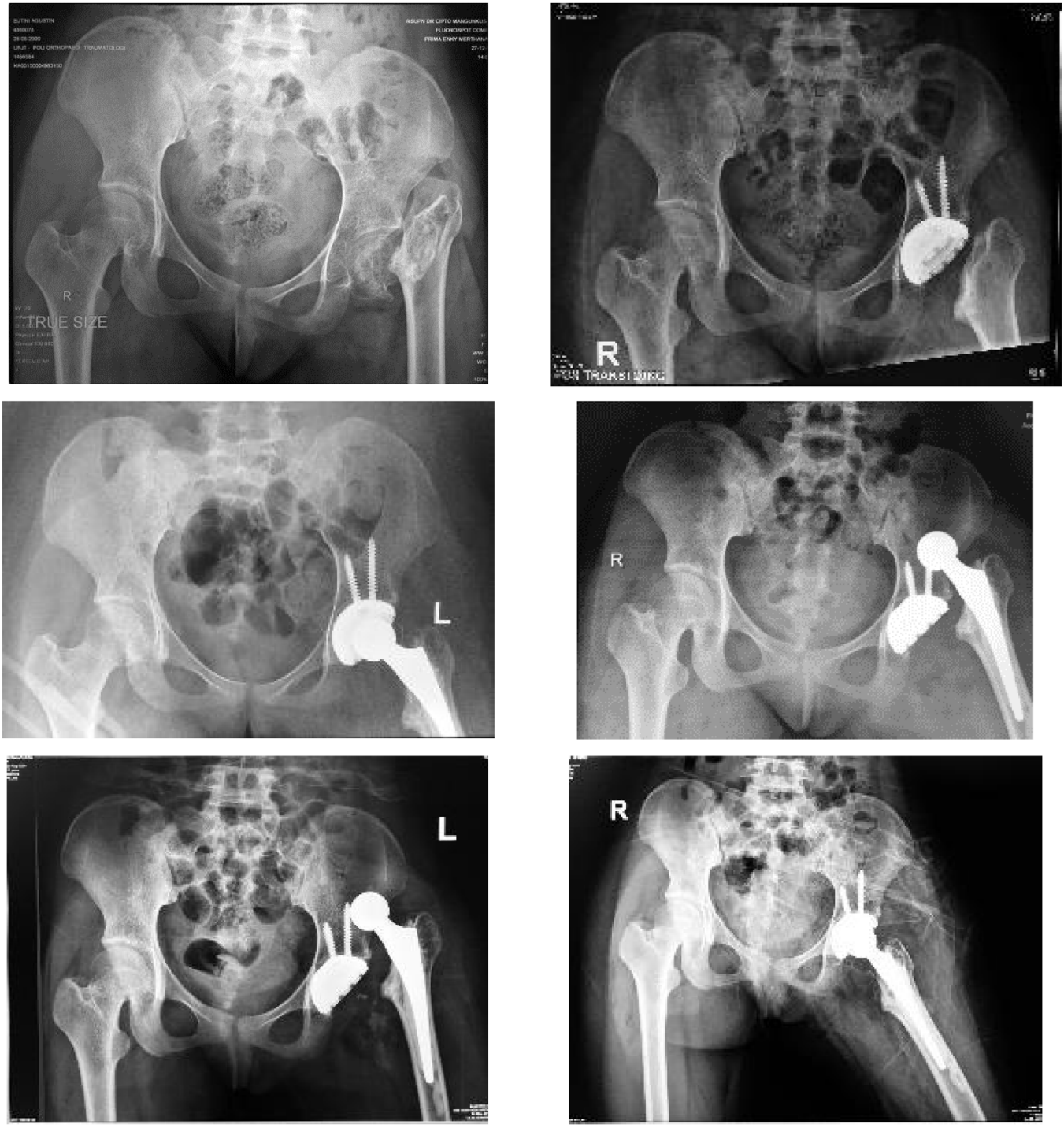

Fig. 1. Multiple hip dislocations following the THR procedure, patient SAg. The patient was admitted with dysplastic hip due to neglected fracture, followed with THR performed in 2 steps: the acetabular component and the femoral component. Multiple dislocation occurred and various procedures e.g. open reduction, soft tissue augmentation, gluteus maximus transfer were performed.

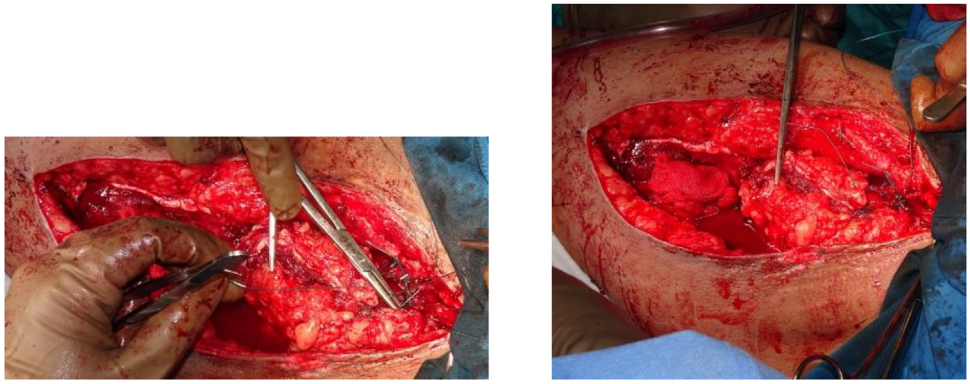

Fig. 2. Patient SAg, gluteus maximus transfer (posterior bundle to lateral aspect) performed to increase stability of the hip joint.

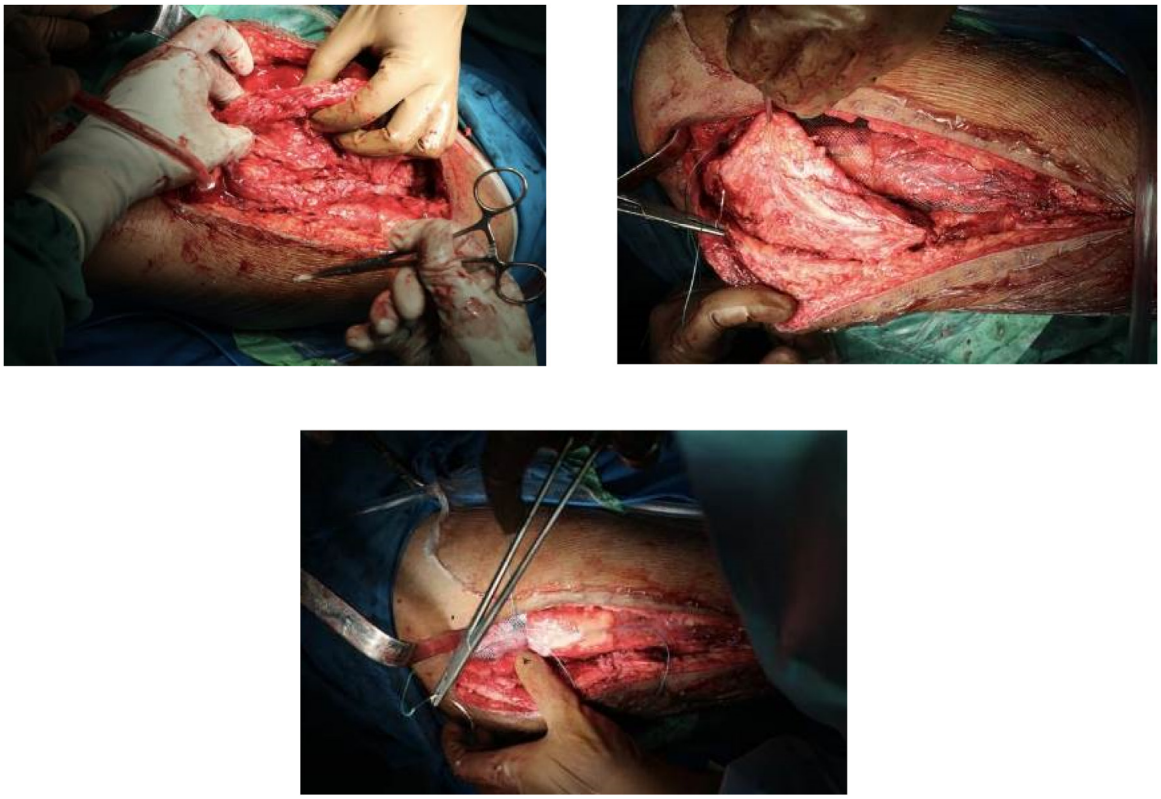

Fig. 3. Patient Bar, gluteus maximus release and transfer, followed by mesh application for augmentation.

gluteus maximus transfer with the addition of mesh capsulorraphy of the hip joint to increase stability and prevent dislocations.

The patients were operated by orthopaedic surgeon who is expert in trauma and reconstruction, the surgery consisted of soft tissue procedure of gluteus maximus transfer and along with capsule augmentation using synthetic mesh. This includes transfer of the gluteus maximus to the intertrochanter region of the femur to act as an abductor replacement. Mesh was added to the hip joint to act as a synthetic capsule to strengthen and provide more stability (Table 1).

The patients were educated to avoid vulnerable positions to prevent dislocation. Postoperative treatment was performed without any difference to those with no history of dislocation. Mobilization and pain management were administrated. Post discharge, we did follow-up and there were no cases of redislocation that is noted between after the procedure and the writing of this report (Figs. 1–6).

3. Discussion

The best approach to manage dislocation after THR is by preventing. Accurate preoperative and surgical planning should be performed. The patient should be positioned properly with extra care for the soft tissues, and intraoperative monitoring. Patient education for after procedure is also important, as patients should be educated on several prohibited positions, including hip flexion of above 90°, internal rotation beyond 0°, and adduction across the midline. Patient should not be seated on a low chair and refrain from squatting. Inadequate education is correlated with an increased risk of dislocation. Previous study showed an adjusted odds ratio of 2.79 of dislocation within six months after the procedure if the patients were not educated properly. Assessment of the cause of dislocation should be identified, along with evaluation of technical aspects of the operation itself: positioning, offset, leg length discrepancy (if present), etc. Additional imaging of true lateral or shoot-through

Fig. 4. Patient TMi, extraction and placement of the new femoral head, followed by mesh application to add support to the capsule.

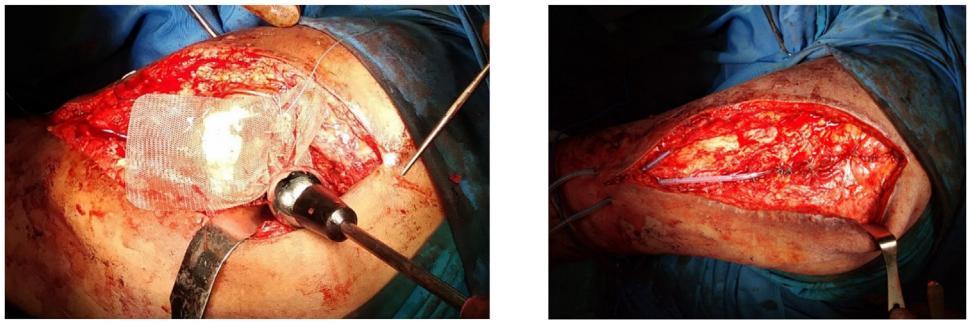

Fig. 5. Patient War, femoral head insertion with mesh support, followed with gluteus maximus advancement.

lateral might be necessary to assess the anteversion of the hip socket, as frog-lateral projection only might be insufficient [7–9].

We performed some soft tissue procedures to add support to the new construct after the procedure. A small posterior flap of the gluteus maximus was transferred under the greater trochanter. This procedure seemed convenient and effective to cover defects of the pelvis structure. With its prior function as the abductor and extensor of the hip, active abduction is made possible if it is attached to the greater trochanter directly [10–13]. And in most cases, the abductor strength from this gluteus maximus procedure is sufficient to stabilize the pelvis and prevent pelvic sag [10]. The use of gluteus maximus and tensor fascia lata transfer might be beneficial for abductor deficiency and is a viable option for therapy, however, further data with larger cohorts should be analyzed to establish the evidence.

The synthetic mesh has been used for an extensive indication in surgery. This includes the surgical management of hernia, such as hernia, tendon ruptures, orbital fractures, etc. The use of mesh to augment the hip capsule reconstruction has not been widely reported, as for THR cases, the utilization of metal mesh is mostly for cases with acetabular defect or deficiency. Current study on the use of acetabular lateral rim mesh was not associated with higher incidence of dislocation as it is not directly influenced with the implantation and stem processes, and only the acetabulum [4,5,14]. Masterson reported a case series on arthroplasties following an excision due to a malignancy on the proximal femur. Of eight cases treated with THR, allograft, and mesh, three dislocations were reported, and patients underwent open reduction. Immediate dislocation was not found postoperatively. The primary material of the mesh should produce inflammatory reaction so that a fibro capsular structure is formed surrounding the hip joint to add stability. Absorbable materials should not be used as a report shows quickly developed instability after the procedure [15].

Technique-wise, the posterolateral approach exposes patients to higher dislocation incidence. However, the posterior soft tissue repair can prevent the dislocation effectively. The incidence of dislocation may drop to eight times after posterior capsular repair [2]. After posterior capsular and muscular repair, surgeons may liberal-

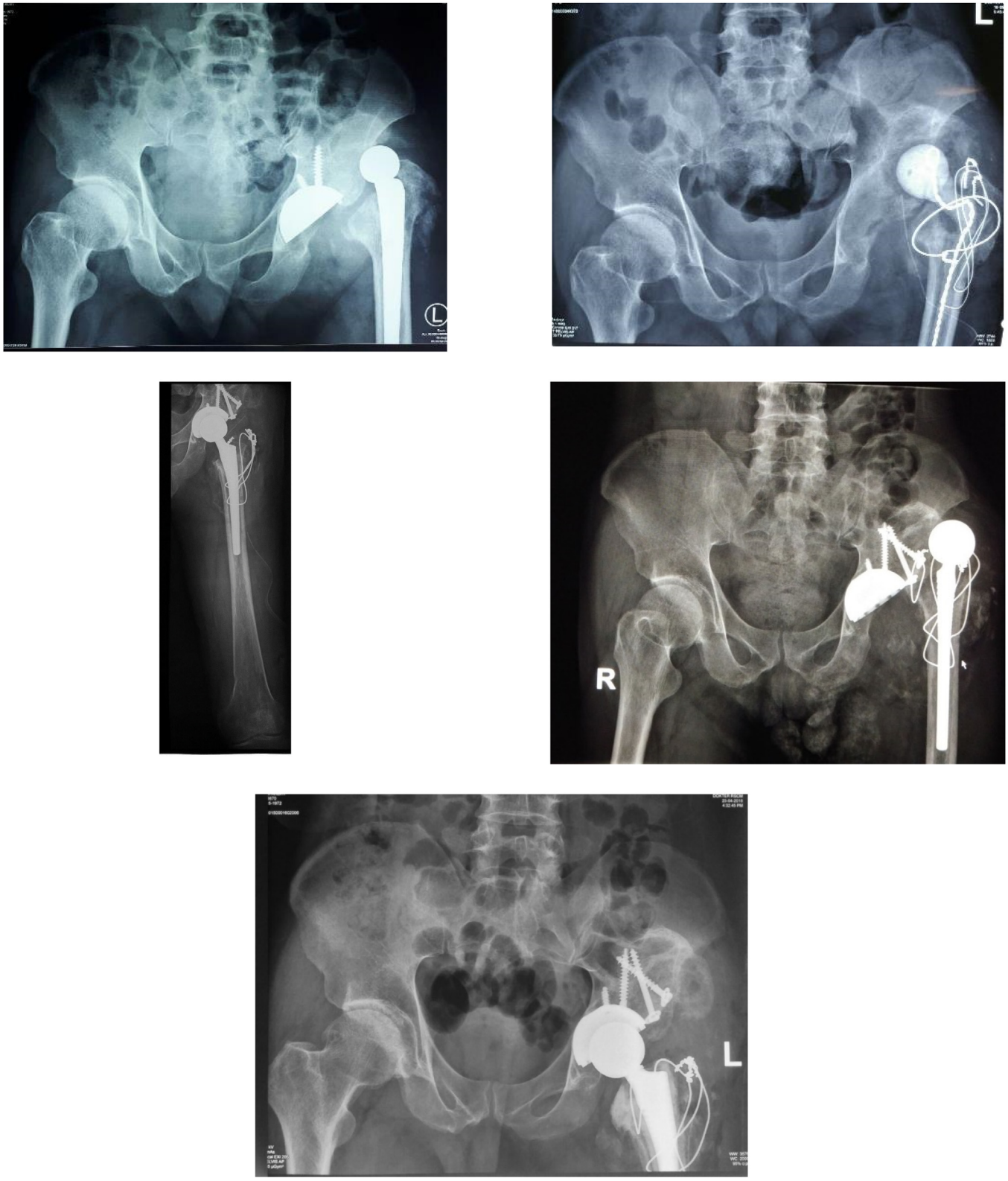

Fig. 6. Patient War, periprosthetic infection occurred and treated with bone cement application, and multiple dislocations happened afterwards. The patient was last treated with open reduction with mesh application and gluteus maximus advancement.

ize restrictions, as study shows no difference in dislocation rates at three months for posterior approach [16]. There is a 11.3%–22.6% re-revision rate after THA revision for recurrent dislocation. It is interesting to find that the use of constrained liner may add support to hip stability, however, it increases the risk of re-revision.

4. Conclusion

The use of mesh in soft tissue procedures, such as capsulorraphy, with the addition gluteus maximus transfer may assist to prevent (re)dislocations of the hip. However, further study should be con-

ducted to validate the routine use of mesh and gluteus maximus transfer to prevent dislocation after the procedure.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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Ethical approval

Ethical approval was not required in the treatment of the patient in this case series.

Consent

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Author contribution

Ardiansyah contributes in the study concept or design, data collection, analysis and interpretation, oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.

Ismail Hadisoebroto Dilogo contributes to the study concept or design, data collection and writing the paper.

Registration of research studies

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