Reviewer No. 02705067

It is a well-written article and very interesting. I accept the publication with some important corrections.

1) Please add the type of surgical approach in the open group, medial or lateral or anterior?

Responses:

- Anteromedial approach was used for medial malleolar reduction and fixation. The reduction was mainly confirmed by the apposition of fracture ridge at the outer rim of ankle joint and not the direct vision in the joint space. It was also confirmed by the fluoroscopic examination.
- Lateral approach was used for lateral malleolar or distal fibular reduction and fixation. The reduction was mainly confirmed by the apposition of fracture ridge at the outer rim of ankle joint and not the direct vision in the joint space. It was also confirmed by the fluoroscopic examination. The final configuration of fractures and alignments was checked by fluoroscopic examination after all fixation(s) and, if the alignment was not acceptable, corrected if possible.

2) Please write the post-operative complications and any arthritic changes in long follow-up (if exist)

Responses:

- Regarding the postoperative complications, there were two patients who had the available records reporting postoperative complications in overall study (ORIF group: 1 patient with major complications needing additional surgeries; ARIF group: 1 patient with a general complication with no need of additional surgeries). In ORIF group, a mentioned patient had major complications as malaligned fracture and loss of reduction following the initial surgery. In the retrospective review of his initially postoperative radiograph, there was the non-anatomic reduction of medial malleolar fracture with a fracture gap around 1.4 mm but it was missed during the procedure. He also had the surgical wound inflammation and possible infection that needed the surgical debridement and hardware removal. He was treated with an ankle arthrodesis as a definitive procedure. He could return to recovery uneventfully following the final treatment. In ARIF group, a mentioned patient had a general complication as the surgical wound inflammation and possible infection that needed only intravenous antibiotic medication and local wound care. Her wound had been healed uneventfully

following the mentioned treatment. Both major and general complications rates were no significant differences between the two groups (p>0.05).

- Regarding the arthritic changes of ankle following the fracture, there were 20 patients who had the follow-up period as at least 16 weeks following the surgeries (mean follow-up time: 9.8 months; range 4-22 months). There were 16 patients (80%) who had mild to significant level of arthritic changes (Table 3). In addition, there were no significant difference of the rates of arthritic changes between ARIF and ORIF groups (p=0.353) (Table 3).
- In conclusion, there was no significant difference between ARIF and ORIF in immediate-postoperative ankle fracture configuration or arthritic changes in a short-term follow-up period. Further study with larger number of patients and longer term of follow-up was needed to validate this conclusion.

3) Photos of X-rays of both groups

Response:

- Figure 1 of the ARIF patient and Figure 2-3 of the ORIF patients were added in accordance with your advice.

4) Add one more paragraph in the discussion session explaining in details the pros and cons of open vs arthroscopic (the authors explain some important subjects, but i prefer the pros and cons more detailed.)

Response:

- Regarding the comparison of advantages and disadvantages between ARIF and conventional osteosynthesis or ORIF, the advantages of ARIF were demonstrated as it could directly assess a reduction of an intra-articular fracture and this could provide more anatomic reduction than ORIF. In addition, this procedure was able to perform the debridement to remove the residual hematoma and synovitis debris that might cause pain and limitation of an ankle motion after fixation. It could perform the arthroscopic repair of concomitant injury such as osteochondral lesions[11, 13]. Finally, it could also help the surgeon to evaluate syndesmotic widening from the syndesmotic injury during the arthroscopic examination[3] and following syndesmotic fixation if this injury was associated with an ankle fracture. The disadvantages of ARIF could be informed as it might considerably add the

operative time by the surgeon with an inadequacy of arthroscopic skills. The longer time of operation might potentially lead to the swelling of surgical wound and compartment syndrome, particularly in some types of ankle fractures such as a Maisonneuve fracture[4]. On the other hand, the advantages of ORIF were explained, as this approach was familiar with any surgeons who had basic skills of the open reduction and fixation of fracture. There was no need of arthroscopic skills to perform this conventional approach. Therefore, this approach is more reproducibility than ARIF. In addition, it has low risk of the compartment syndrome following the operation. However, the disadvantages of ORIF could be as the inability to directly confirm the anatomic reduction of fractures in the joint space. The reduction was routinely checked by the apposition of fracture ridge at the outer rim of ankle joint and by the fluoroscopic examination. These methods could miss some subtle malreduction of fracture in the joint[11] as shown in one patient in ORIF group in the present study. This approach could not perform directly debridement of the residual hematoma included another debris in the joint. It could not perform simultaneously repair of associated lesions, such as osteochondral lesions, or directly assess the syndesmotic widening during the procedure. Surgeons may have to consider these advantages and disadvantages of each approach when they have to make any decision for their patients.