Outcomes of internal fixation of intracapsular hip fractures using dynamic locking plate system (Targon® FN)

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ABSTRACT

Background: Targon® FN locking plate system for intracapsular fracture fixation provides superior rotational stability and been found to reduce rate of complications and improve patients' outcomes. We aim to review the clinical outcomes of Targon® FN system in our unit.

Methods: retrospective consecutive study of patients with intracapsular hip fractures treated with Targon locking plate with a minimum 18 months follow up. Our primary outcome measure was rate of complications and re-operations.

Results: 43 consecutive patients (32 females, 11 males) with average age of 77 years (range 46–93). There were 34 (79%) non-displaced fractures and 9 (21%) displaced fractures. The complication rate was 11.6%; 2 patients developed avascular necrosis, 2 patients had non-union and 1 patient had femoral head screw cut-out. Overall re-operation rate was 9.3%.

Conclusion: Intracapsular hip fracture fixation using the Targon® FN locking plate system seem to achieve satisfactory outcomes with low rate of complications.

1. Introduction

Intracapsular hip fractures account for ~50% of all hip fractures in the elderly.¹ These are generally treated with arthroplasty surgery either partial or total hip replacement. Internal fixation is indicated for undisplaced fractures or when preservation of the femoral head is desired. This has been traditionally achieved by using cannulated screws or a sliding hip screw and plate constructs. However, when fracture fixation has been used, high rate of complications of fracture collapse and displacement have been reported particularly with displaced fractures.² These complications are thought to be largely mechanical.³ The innovative Targon® FN locking plate system (*Aesculap B. Braun, Tuttlingen, Germany*) has been designed to provide superior rotational stability and been found to reduce rate of complications and improve patients' outcomes.^{3–5} In our unit, we use cannulated screws, dynamic hip screw fixations and recently introduced the Targon® FN locking plate system. The aim of this study was to review the outcomes of intracapsular hip fracture fixation using the Targon® FN system at our district general hospital unit.

2. Methods

This was a retrospective consecutive study of patients with intracapsular hip fractures treated with Targon® FN locking plate system with a minimum 18 months follow up. Study protocol was approved by the local Research and Clinical Effectiveness Department. Preoperatively, all patients were managed according to our local hip fracture pathway and National Health Institute for Health and Care Excellence (NICE) guideline (CG 124)⁶ including orthogeriatric and anaesthetic assessments. The decision of whether patients underwent internal fixation or arthroplasty surgery was made by the surgeon based on fracture displacement, patients' co-morbidities and functional demands. Fracture displacement was described using the Garden hip fracture classification system.⁷ Intraoperatively, patients were positioned supine on standard traction table with closed reduction manoeuvres under image intensification and standard internal fixation techniques through direct lateral approach using the Targon® FN locking plate system. Postoperatively, patients were allowed to mobilise fully weight bearing as tolerated and underwent routine postoperative hip fracture rehabilitation. Patients were followed in fracture clinic

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Table-1

Fracture configuration based on Garden classification system, complications and re-operation rate.

Displacement	Garden Classification	No. patients	Complications	Re-operation
Non-displaced	Garden I	5	–	–
	Garden II	29	3 (AVN, non-union, screw cut-out)	1 implant removal 1 Arthroplasty
Displaced	Garden III	6	1 (non-union)	Arthroplasty
	Garden IV	3	1 (AVN)	Arthroplasty
Total		43	5 (11.6%)	4 (9.3%)

AVN: avascular necrosis.

upon hospital discharge with radiographic and clinical assessment at 6-weeks, 3-months, 6-monthly thereafter until union achieved. Patients were monitored for fracture complications particularly fracture displacement, avascular necrosis, screw cut-out or need for further surgery.

3. Results

We included 43 consecutive patients (32 females, 11 males) with average age of 77 years (range 46–93). There were 34 (79%) non-displaced fractures (Garden type I, II) and 9 (21%) displaced fractures (Garden type III, IV). (Table 1). Thirty-eight patients (88.4%) achieved radiological fracture union and satisfactory clinical outcomes (Fig. 1). The complication rate was 11.6%; 2 patients developed avascular necrosis with head collapse within 3-months of surgery, 2 patients had non-union and 1 patient had femoral head screw cut-out (Fig. 2). Of those 5 patients, 3 underwent further surgery with revision arthroplasty and 1 had the implant removed with overall re-operation rate of 9.3% (Table 1). Finally, 1 patient with avascular necrosis had poor mobility and significant comorbidities and was managed conservatively.

4. Discussion

In this study we presented the results of a consecutive series of intracapsular hip fractures treated with the Targon® FN system in district general hospital settings. Our results demonstrate high union rate and

satisfactory outcomes in the majority of patients. In their original study or 83 patients, Parker et al.⁵ showed promising clinical results with non-union occurring in 3% of undisplaced and 15% or displaced fractures respectively, and 5% avascular necrosis. More recently, Parker et al.⁸ reported outcomes of intracapsular hip fracture fixation in a large cohort comparative study of Targon® FN system and cannulated screws construct. The overall non-union rate for cannulated screws was 19.5% vs. 9.5% for Targon system. Similarly, rate of revision surgery was 19% vs. 9% respectively.

Similar results to those reported by the inventors^{5,8} have also been published. In their Japanese series of 84 intracapsular hip fractures treated with Targon® FN system, Takigawa et al.⁹ reported overall rate of complications of 10.7%. Finally, in a recent meta-analysis of four studies involving 385 intracapsular hip fractures comparing the Targon® FN system with alternative implants (cannulated cancellous screws or sliding hip screw), there were statistically significant differences in the rate of non-union and revision surgery in favour of the Targon® FN system. However there were no statistically significant differences in avascular necrosis, screw cut-out or non-orthopaedic complications.¹⁰

Our results are comparable with the few published studies on this novel implant. Our overall rate of complications was 11.6% with four patients requiring further surgery. This study is limited by its small number of patients and its retrospective design. It does, however, add to the growing evidence supporting the use of the Targon® FN system for intracapsular hip fractures. Further research with large controlled trials

Fig. 1. Plain radiographs of left hip as an example of intracapsular hip fracture (a) in 78 years old lady treated with Targon plate (b; postoperative radiograph) achieving satisfactory clinical outcomes and fracture union (c; radiograph at 12-months follow up).

Fig. 2. (a–b) Plain radiographs of displaced left hip fracture in a 77 years old female. (c) intra-operative image intensification radiograph demonstrating Targon plate fixation. (d–g) Sequential post-operative plain radiographs of the left hip demonstrating shortening of the femoral neck and femoral head screw cut-out.

is required to further evaluate the effectiveness and cost-effectiveness of this implant compared with alternative surgical implants or hip hemiarthroplasty.

Conflicts of interest

None by any of the authors.

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