INTRODUCTION
Subchondral insufficiency fracture of the femoral head has been described in both the osteoporotic elderly and renal transplant recipients. Some cases have resolved after conservative therapy without progressing to collapse, however, other cases have been reported to undergo a subchondral collapse requiring operative treatment. Recently, cases with subchondral insufficiency fracture who underwent rapid destruction of the hip joint have been described, where the relationship with rapidly destructive arthrosis of the hip (RDA) has been proposed [1].

RDA is a relatively uncommon form of arthritis seen mostly in elderly females [2]. Characterized by rapid joint destruction within 6 to 12 months, disappearance of the joint space is the typical initial finding on radiographs followed by rapid disappearance of the femoral head. In general proliferative changes are minimal. Predominance of bone resorption over bone formation has been regarded as a contributing mechanism to rapid joint destruction, however, the pathogenesis of this condition remains idiopathic.

In this study, we have reviewed clinicopathologic appearances of 15 cases of subchondral insufficiency fracture, who underwent rapid destruction of the hip joint just as seen in RDA.

MATERIALS AND METHODS
Fifteen consecutive cases of subchondral insufficiency fracture of the femoral head, confirmed histopathologically, were retrospectively reviewed, where radiographs both at the onset of hip pain and at the time of surgery were available and showed rapid destruction of the hip joint within 12 months. The histopathologic materials reviewed in each case were gross photographs, specimen radiographs, and microscopic sections.

The morphologic criteria for diagnosis of subchondral fracture were as follows. On gross examination, a linear notched zone paralleling the subchondral bone endplate is generally seen. Its color is usually whitish grey. Microscopically, the whitish grey areas consist of irregularly arranged fracture callus, reactive cartilage, and granulation tissue [3].

RESULTS
All cases were over 50 years of age (range 53 to 78, average age 67) and 11 were women. There was no history of corticosteroid intake or alcohol abuse before the onset of hip pain. Nine cases were overweight (all women) and 7 had compression fractures in the spine. Based on clinical examinations and laboratory studies, infection, rheumatoid arthritis, neuropathy and other associated underlying diseases were ruled out. All cases were treated initially by non-steroidal anti-inflammatory drugs and the addition of a crutch or walker.

On plain radiographs, the normal joint space had undergone rapid narrowing and/or disappeared within 9 months. The rate of joint space narrowing ranged 0.4 mm/month to 3.0. MRI showed a pattern of bone marrow edema from the upper portion of the femoral head to the intertrochanteric region with associated focal low intensity band on T1 paralleling the articular surface. This low intensity bands corresponded to the subchondral fracture line.

Histopathologically, in all cases evidence of subchondral insufficiency fracture was confirmed. Additionally, in the marrow space, there were several round to oval granulomatous foci, which consisted of amorphous debris, fragmented bone and articular cartilage surrounded by reactive histiocytes and giant cells (Fig. 1). This type of granulomatous lesion has been reported in the advance stage of RDA [4], and we consider it pathognomonic of rapid joint destruction. No evidence of primary osteonecrosis was observed in these specimens. All the cases were osteopenic histopathologically.

Although focal thinning and/or absence of the articular cartilage was noted at the superior portion of the femoral head, it was relatively well preserved on the other areas of the femoral head with viable chondrocytes, indicating that there was no evidence of chondrolysis morphologically. No evidence of pannus formation, chondrocalcinosis or apatite crystals deposition was present. The synovial tissue showed mild hyperplasia and hypertrophy with minimal inflammation. Focal accumulations of eosinophilic amorphous debris with included small pieces of bone and articular cartilage detritus were present.

DISCUSSION
In general, the prognosis of a fracture may depend on a number of variables including the degree of osteopenia, activity, weight, the extent of fracture, and the adopted treatment modality. In the cases reported herein, a subchondral collapse rapidly progressed. However, there was histopathological evidence of callus formation and granulation tissue around the fracture, indicating the potential capacity for a resolution of the fracture. Important factors for the rapid joint destruction in these cases may have been the extent of a subchondral fracture, osteopenia, overweight, and the use of anti-inflammatory drugs on the fracture. However, the outcome of subchondral insufficiency fracture may need further investigation.

Recently, a relationship between subchondral insufficiency fracture and RDA has been suggested. RDA has been reported to have the following characteristics; it generally occurs in elderly people with severe unilateral hip pain, in whom initial radiological examinations show no obvious findings. Within a few months a rapid destruction of the hip joint occurs with few proliferative changes. Histologically a granulomatous lesion has been reported as a characteristic finding. All these findings were observed in the cases of subchondral insufficiency fracture reported herein. Subchondral insufficiency fracture thus seems to be one of the important factors involved in the pathogenesis of RDA.

REFERENCES

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