Fascia iliaca compartment block for patients with proximal femoral fracture
-Prospective evaluation of the efficacy and safety-

INTRODUCTION
Proximal femoral fractures are most common fractures in the elderly. To relieve the pain due to the injury, conventional management modality is administration of systemic opioids and non-steroid anti-inflammatory drugs (NSAIDs). In this study, we examined the effectiveness of fascia iliaca compartment block (FICB) in pain management in acute stage for patients with proximal femoral fractures.

METHODS
Fifty consecutive patients visiting our institute with proximal femoral fractures from April 2009 to May 2011 were included in this study. These 50 patients were randomly assigned two groups. In Group 1 patients, FICB was performed immediately after the arrival and in the post-operative period. Group 2 patients were managed only with NSAIDs. Neither Group 1 nor Group 2 patients were permitted to take supplemental oral NSAIDs as requested. Effectiveness of pain control was evaluated by using 15-degree leg lift test and Visual Analog Scale (VAS). The assessment was performed before the block, 1 minute and 12 hours thereafter. FICB was performed by an orthopaedic resident (Y.F) in all cases.

Procedure of fascia iliaca compartment block
No premedication or sedation was administered, and the patient was placed in the supine position. A line was drawn on the skin from the pubic tubercle to the anterior superior iliac spine, and trisection. The puncture site was marked 2 cm caudal to the point dividing the lateral third and medial two third of this line. After skin preparation, the nerve block needle was inserted perpendicular to the skin. First loss of resistance was felt as the needle passing the fascia lata. The needle was further advanced until second loss of resistance, which was felt as passing the fascia iliaca. After aspiration to confirm the extravascular location of the needled tip, the block was performed with 10 ml of 0.75% ropivacaine and 10 ml of 2% mevipicaine.

This study was approved by the Institutional Review Board and all patients signed informed consent.

RESULTS
Patient demographic data were shown in Table 2. There were 37 females and 13 males with the mean age of 80 years (56 - 98 years). Radiological confirmation of the proximal femoral fracture was made for all patients. Twenty-nine fractures were extracapsular and 21 were intracapsular. ORIF was performed for the 29 extracapsular fractures, while a bipolar hemiarthroplasty(13) and ORIF(8) were indicated for 21 intracapsular (neck) fractures.

No block-related complication or block failure was encountered in the study period. VAS score with 15° leg lift test was 100/100 both in Group 1 and 2 patients after arriving at emergency unit. After the FICB, the average VAS scores were significantly reduced to 29 and 36 at 10 minutes and 12 hours. By contrast, VAS score was not significantly improved in Group 2 (Table 3 and Fig 1).

Regarding the effectiveness of the FICB in controlling postoperative pain, the VAS score was significantly lower in Group 1 (15, 21, and 30) compared with Group 2 (59, 49 and 59) at 10 minute, 6 hours and 12 hours respectively (Table 4 and Fig 2). Number of the patients requiring NSAIDs during initial 12 hours after surgery was significantly lower in Group 1 (21%) than Group 2 (82%).

DISCUSSION
It has been shown that lumbar plexus block provides higher analgesic effect with fewer side effects compared with systemic administration of NSAIDs in patients with proximal femoral fractures. FICB is an approach to an anterior lumbar plexus from a puncture site distant from the neurovascular sheath. Assist of nerve stimulation is not required. The fascia iliaca compartment is enclosed with the fascia iliaca and iliocostal muscle. The femoral nerve and the lateral cutaneous nerve of the thigh emerge from the transverse section of the inguinal ligament into this compartment. Local anesthetics injected into this compartment spread to the nerves innervating the hip and proximal femur regions, and may reach the femoral and lateral cutaneous nerve. By contrast, an obturator nerve block is not always effective because the deep fascial fold may act as a barrier to the local anesthetics preventing its infiltration into the obturator nerve area. Capdevila claimed the advantage of the FICB in technical easiness and convenience and conducted a clinical study, confirming that sensory blockade of the lateral cutaneous nerve of the thigh could be achieved rapidly and consistently with this technique.

The present study has shown that FICB on arrival at the emergency unit in patients with proximal femoral fracture successfully reduced the acute pain. The immediate analgesic effect was confirmed by the significant reduction in VAS score at 10 minutes. Moreover, the reduction in pain score was maintained thereafter with a significant effectiveness continuously observed at 12 hours after the block.

Previous studies have reported the relatively high successful rate (67-96%) of the FICB performed at emergency unit. It was reported that either a junior register or an emergency department physician could successfully perform the FICB, because the procedure is simple and relatively easy to learn with a steep learning curve. In our study protocol, FICB was performed by an orthopaedic resident who was instructed by an anesthetist. Consequently, satisfactory pain control was achieved without complication or block failure.

In conclusion, FICB can be performed safely and effectively in controlling pain for patients with proximal femoral fracture regardless of the experience of the performing doctor.