INTRODUCTION

We report on an innovative surgeon-less technique to treat painful benign bone tumors with noninvasive Magnetic Resonance-guided High-Intensity Focused Ultrasound (MR-HIFU) with perioperative pain management using lumbar plexus block. Novel use of MR-HIFU offers noninvasive treatment for osteoid osteoma using focused ultrasound sound wave energy from an external transducer to rapidly heat targeted tumor under MR imaging guidance. To generate tissue destruction, temperature >50 °C for at least 10 seconds is required. However, most practitioners use higher temperatures (65-85 °C) and longer time periods to ensure complete thermal coagulation necrosis [1-3]; resulting in intense pain during the procedure.

METHODS

This is a case report of the perioperative care of a 10-year-old, 30kg girl with a painful osteoid osteoma within the left proximal anterior femoral metadiaphysis who presented for MR-HIFU treatment. We measure pain scores throughout the treatment and narcotic use perioperatively. The patient’s legal guardian has given permission to publish this report.

RESULTS

Following induction of general endotracheal anesthesia, a lumbar plexus block was placed successfully. General anesthesia was maintained and therapeutic ablation treatment with MR guided HIFU was performed. The temperature in the nidus reached >70 °C during the treatment. The patient did not exhibit any signs of hemodynamic or temperature derangements during thermal ablative treatment and did not require any additional narcotics during the procedure. Following treatment, the patient was extubated with no complaints of pain. Her postoperative course was unremarkable, and pain score decreased from preoperative 7/10 to 2/10. The patient was monitored for six hours in PACU during which she received 0.03mg/kg morphine, 0.5mcg/kg fentanyl, 0.5mg/kg ketorolac, and subsequently discharged home. Clinical follow up at one and three months after treatment revealed that the patient had 0/10 pain and no longer required non-narcotic pain medications.

CONCLUSIONS

In summary, use of regional anesthesia for noninvasive MR-HIFU should be considered to optimize perioperative pain control.