



**CASE REPORT**

# Role of Radiation Therapy in Heterotopic Ossification: A Clinical Case Report

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## Introduction

Heterotopic ossification is the formation of mature, lamellar bone in soft tissues where bone does not normally exist. It is commonly seen following trauma or surgical intervention of periarticular soft tissue and is commonly associated with injury to the hip. The three primary causes can be grouped into traumatic, neurogenic and genetic etiologies. Heterotopic ossification from trauma can occur following fractures, dislocations, and operative procedures such as open reduction-internal fixation or total hip arthroplasties [1]. Heterotopic Ossification of the hip often involves the abductor compartment,

though any compartment surrounding the hip can be involved. Other reported sites of joint HO after trauma include the knee, shoulder, ankle and temporomandibular joint [2]. Management of HO includes Surgery followed by prophylactic management which includes

### Abstract

Heterotopic ossification (HO) is defined as the formation of mature, lamellar bone in soft tissues where bone does not normally exist. HO is commonly seen following trauma or surgical intervention in periarticular soft tissue and is commonly associated with injury to the hip. The three primary causes can be grouped into traumatic, neurogenic and genetic aetiologies. HO from trauma includes fractures, dislocations, and operative procedures such as open reduction-internal fixation (ORIF) or total hip arthroplasties (THA). The main medical therapy used for HO prophylaxis is nonsteroidal anti-inflammatory drugs (NSAIDs). Radiation therapy has been found to be more effective than NSAIDs in multiple trials. Today Radiation Therapy is being recommended in select patients and while effective, one has to weigh the benefits versus harm of this therapy in asymptomatic patients.

### Keywords:

- + Heterotopic Ossification
- + NSAIDs
- + Open reduction-internal fixation
- + Total hip arthroplasties
- + Radiation therapy

NSAIDS and Radiation therapy. Here is a small case of Heterotopic Ossification where Radiation therapy is given as prophylactic treatment post-surgical excision.

**Case Report:**

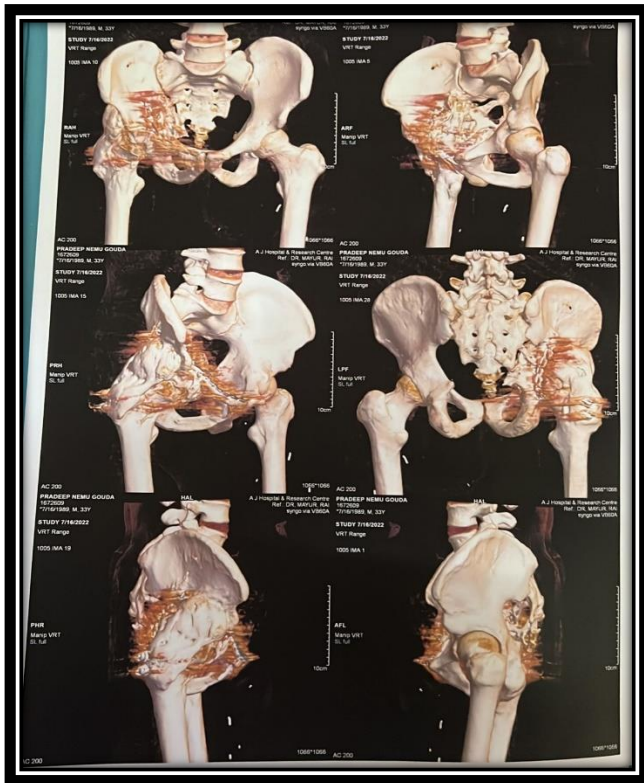


Figure 1: Depicting 3D reconstructed CT of Right Hip with Heterotopic Ossification

A 33-year-old gentleman presented with complaints of right ankle pain with 2-3-month history. Patient gives a history of Road traffic accident (RTA) following which he underwent Right leg exploration along with Right hand debridement and suturing along with Right tibia intramedullary nailing and Right acetabular plating. Post Op surgical period for uneventful. Later after 3 years following surgery patient developed stiffness in his Right hip for which he was evaluated and diagnosed with Heterotopic Ossification and underwent excision and referred to Radiation oncology department in view of Radiation therapy to post OP site in view of prophylactic management.

**Diagnostic Assessment:**

A CT Peripheral Angiogram was done and shown Comminuted fracture of right acetabulum, inferior pubic ramus, pubic symphysis on the right side. Fracture of the shaft of tibia and fibula. Chip fracture of the calcaneum and also CT Pelvis post shown Plating in acetabulum with callus formation and Intramedullary nail in right femur, Bones appear osteopenic on imaging.

**Therapeutic Intervention:**

After giving proper counselling about disease & treatment, patient underwent CT simulation and planned for Radiation therapy to the

Post Excision site. The volumes for the treatment was contoured and Radiation therapy was delivered was on a 6MV linear accelerator, with a dose of 10Gy in 1# to the involved site using 3DCRT technique with continuous monitoring of the patient. Patient is reviewed for 1st followed for post 1 month of treatment. Patient is stable with good range of movements. Patient asked to continue precautions and asked to review post 3 months of treatment and patient yet to review.

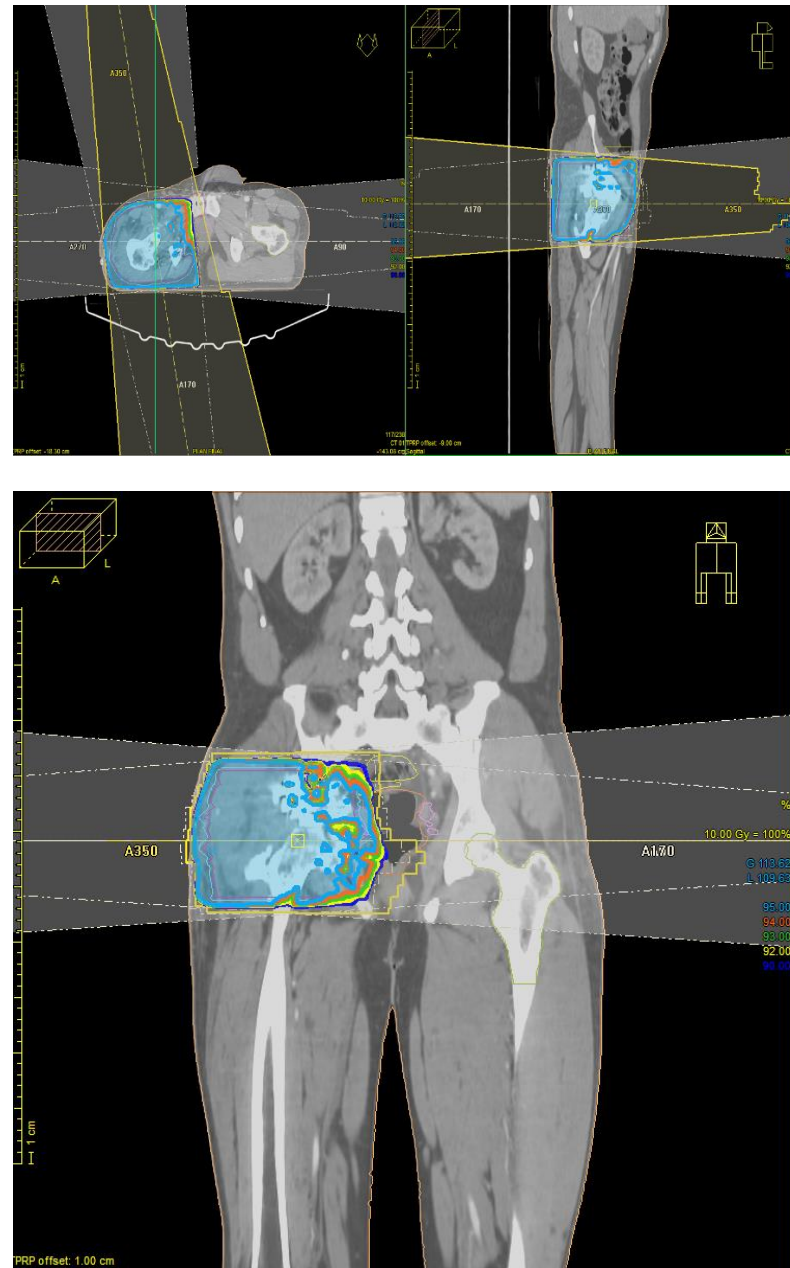


Figure 2: Image showing 3DCRT Plan for Heterotopic Ossification

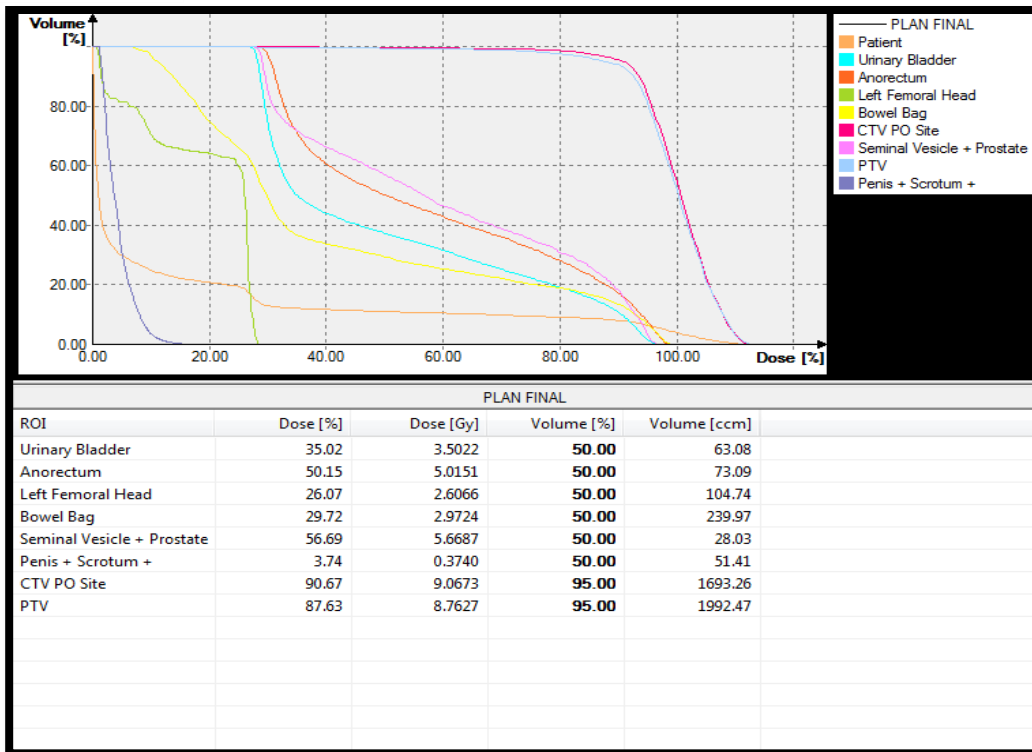


Figure 3: Dose volume Histogram showing dose to Organs at Risk around Treatment field

## Discussion:

Heterotopic ossification (HO) is defined as the formation of mature, lamellar bone in soft tissues where bone does not normally exist. HO is commonly seen following trauma or surgical intervention in periarticular soft tissue and is commonly associated with injury to the hip. The three primary causes can be grouped into traumatic, neurogenic and genetic etiologies. The hip is the most common site, followed by the elbow. Other major joints are sometimes affected [1]. The classic presentation of nongenetic HO is in young adults with a clear history of local trauma or surgery. Approximately half of patients are in their second and third decades of life; however, a broad age distribution is present from infancy to late adulthood [3]. The typical clinical features of HO include the limited range of motion around the involved joint, complete bony ankyloses in severe cases, and deformity in the cervical spine, elbow, shoulder, fingers, jaw exostosis, or temporomandibular joint ankyloses. Sometimes HO can only be detected as an asymptomatic finding on a radiograph [4]. Daily functions of HO patients can be hampered by the loss of normal posture, pain, inflammation, reduced mobility, formation of pressure ulcers, deep venous thrombosis, and other complications [5]. Despite the risk that it can trigger another round of HO, surgery remains the only treatment option to date once bone tissue has formed. Currently, the most popular drugs for HO are cyclooxygenase-2 (Cox2) inhibitors and non-steroidal anti-inflammatory drugs (NSAIDs), both of which target pro-inflammatory prostaglandins. Traditional NSAIDs such as aspirin, ibuprofen and indomethacin inhibit the formation of both the physiological and inflammatory prostaglandins [5]. Bisphosphonates also shows good results. Many benign diseases are managed with Radiation Therapy. Among them prevention of Heterotopic Ossification is a usual

indication for RT among many centers worldwide. A single fraction of RT seems to be a sufficient, cost effective and a safe treatment regimen [6]. Radiation therapy is indicated as a prophylaxis to prevent recurrence post-surgery. A single fraction of treatment would be suffice. It has been shown that radiotherapy is more effective in the early phase of HO. It is recommended that surgery alone increases recurrence rates and radiotherapy should be given at preoperative and early postoperative period to prevent recurrence. It is recommended that radiotherapy should be given within first 72 hours after surgery [7]. In this case patient symptoms are reduced after post OP Radiation therapy and there is decrease in limitation of motion on follow up. Further follow up is required to completely study the effects of Radiation therapy in Heterotopic Ossification.

## Conclusion:

In conclusion, Radiotherapy in combination with anti-inflammatory drugs is an effective treatment algorithm in patients at high-risk for HO development such as those undergoing total hip replacement. However, there is a need for further clinical trials with larger sample size that assess effectiveness and adverse effects of prophylactic RT in HO according to age groups.

## Patient Perspective:

Satisfactory

## Informed Consent:

Informed consent was taken prior Imaging and Prior management.

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