

PELVIC INSUFFICIENCY FRACTURE [PIF]-A UNDER/MISDIAGNOSED ENTITY

Kanhu Charan Patro¹, Siva G. Prasad², Raghava Kashyap³, Muralikrishna Voonna⁴, Chitta Ranjan Kundu⁵

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ABSTRACT: Cancer cervix is the most common malignancy in the developed country and one of the most curable disease. Radiation treatment is the mainstay treatment for carcinoma cervix. There is also long follow up noted. After radiation treatment, radiation related late side effects like cystitis, proctitis which are seen in regular practice but one radiation related side effect called pelvic insufficiency fracture which is not very common but one of the under diagnosed, misdiagnosed and mismanaged entity is observed. Here we are explaining this entity from diagnosis to treatment with review literature.

KEYWORDS: Fracture, Radiation.

INTRODUCTION: Cancer cervix is the most common female malignancy in developing world.¹ Definitive radiation plays an important role in offering curative treatment with excellent long term outcomes in majority of the patients.² In patients treated with radiation, low back ache is a symptom which is overlooked and undermanaged and generally regarded as vague. We would like to highlight one of the important causes of low back ache in post radiation setting to the pelvis in patients with carcinoma of cervix.

DISCUSSION: Pelvic insufficiency fractures one of the complications of radiation often presents with low back pain. Pelvic insufficiency fracture is a type of stress fracture and it refers to the failure of the skeleton to withstand submaximal forces over time. Insufficiency fracture results when normal stress is applied to abnormal bone (such as bone with osteoporosis). The other causative factors are renal failure, rheumatoid arthritis, extended corticosteroid use and mechanical changes after hip arthroplasty.

Radiotherapy results in an increased rate of these fractures and is reported widely in various literatures. Study by Baxter et. Al,³ analysis of the data showed that the incidence of pelvic fractures within the first five years was statistically significantly greater in the irradiated group than in the non-irradiated group with highest incidence in patients of anal cancer (approximately 14%) due to larger area of the irradiation field and higher dose delivered compared cervix or rectal cancers.

Most of these fractures are seen in postmenopausal woman. Abe et al,⁴ showed that the time to present clinically is 1 to 2 year after radiation therapy and reported the - radiation dose response relationship and development of pelvic insufficiency fractures. They showed that the patients receiving more than 50Gy are more prone for development of this entity.

Ichiro ogino,⁵ studied various risk factors associated with PIF like age, weight, type II diabetes, delivery, menopause, total external dose, total brachytherapy dose and it was found that, body weight

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49 kg or below ($P=0.044$), more than three deliveries ($P=0.021$) are the most significant risk factors developing for PIF.

Pathogenesis is mostly due to series of pathological changes, ranging from mild inflammation to neoplasia. Changes either may be delayed or acute. Radiation has been shown to directly affect osteoblasts, osteoclasts, and osteocytes, resulting in a net reduction in bone matrix production. In addition, radiation has been reported to cause microvascular occlusion and further compromise of osteoblast function. Artificial menopause is due to irradiation to ovarian irradiation-osteoporosis.

Diagnosis is mainly depending upon radiological findings. On X-ray the changes are very subtle and chances of missing high. Osteolytic lesion on sacral ala and pubic symphyseal areas and adjacent sclerosis is found. The degree of confidence is low due to subtle and non-specific findings. On CT scan typical of fracture lines on sacral ala parallel to sacroiliac joint are seen and sclerosis at adjacent area. CT findings may be definitive for the diagnosis of insufficiency fractures of the pelvis. MRI is highly sensitive and highly specific. In T1 as well as T2 weighted images decreased signal intensity is specific. Sometimes traces of fluid may be also observed, and if there is edema will found and that having increased signal intensity. However, it cannot be used in patients with Pacemakers, which is a significant limitation in the elderly population.

Bone scan is highly sensitive. Pattern 'H', butterfly pattern on sacral ala, Honda sign (Ref) are characteristic of insufficiency fracture on a bone scan, the degree of confidence may be high. Nuclear studies are highly sensitive and highly specific when a typical pattern of sacral uptake or concomitant sacral and pubic uptake is observed.

The prevention of osteoporosis and pelvic fractures may result in improved survivorship in women undergoing radiotherapy. Calcium supplementation by extra dietary calcium daily is good enough to prevent osteoporosis.

The main stay of treatment is conservative treatment like, no extra stress on bone, analgesics, physiotherapy, lumbosacral belt, calcium/vitamin D3 supplementation.

Physical therapies like Heat, Massage therapies, TENS (Transcutaneous Electrical Nerve Stimulation), bed rest, lumbosacral belt and Physiotherapy can be tried.

Analgesics prescription should follow the WHO ladder. There are reasons of concern about the use of peripherally acting analgesics (NSAIDs) in fracture healing, because they block the activity of prostaglandins, especially PGE₂, which plays a significant role in bone healing NSAIDs are associated with a high risk of delayed union or non-union of long bone fractures, even after surgical treatment. For this reason NSAIDs are not recommended for the therapy of sacral stress fractures.⁶ Antiresorptive therapies include raloxifene Bisphosphonates and Calcitonin. Treatment with raloxifene reduces vertebral fractures risk.⁷

In rare cases surgical intervention like sacroplasty etc. are mentioned but when conservative management fails.

In radiotherapist point of view, is refinement of radiotherapy technique/dose required? Can we consider reducing the dose contribution to the sacrum and sacroiliac joints, without underdosing the tumor, especially in Postmenopausal women, with many deliveries? It is a difficult issue to decrease the dose to sacrum and sacroiliac joint as presacral nodes are the risk site for metastasis in rectum, cervix and anal canal cancers.

To conclude, knowledge of pelvic insufficiency fractures is essential in order to rule out metastatic disease, and thus avoid inaccurate treatment. Recognizing this entity is very crucial,

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mostly in postmenopausal woman, which usually starts with 1-2 year of treatment, do not misdiagnose with metastasis. Bone scan is highly sensitive. Pattern 'H', butterfly pattern on sacral ala, Honda sign are Characteristic of bone scan, Simple conservative management with calcium supplementation is sufficient.

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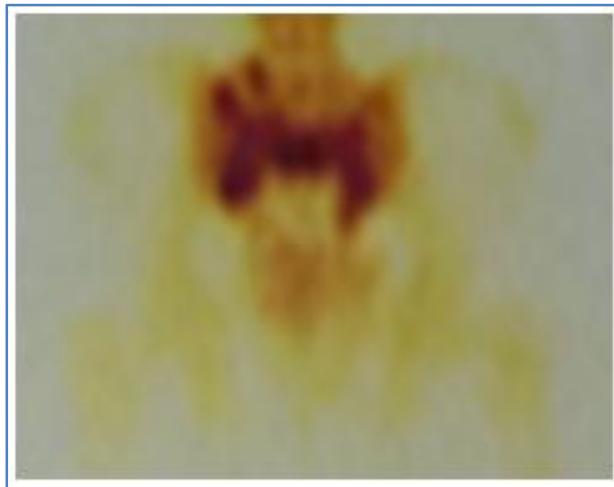


Fig. 1: Butterfly/ Honda/H sign on bone scan at sacroiliac area

AUTHORS:

1. Kanhu Charan Patro
2. Siva G. Prasad
3. Raghava Kashyap
4. Muralikrishna Voonna
5. Chitta Ranjan Kundu

PARTICULARS OF CONTRIBUTORS:

1. HOD, Department of Radiotherapy, Mahatma Gandhi Cancer Hospital & Research Institute, Visakhapatnam, Andhra Pradesh.
2. Assistant Professor, Department of Orthopaedics, KIMS, Ammalapuram, Andhra Pradesh.
3. HOD, Department of Nuclear Medicine, Mahatma Gandhi Cancer Hospital & Research Institute, Visakhapatnam, Andhra Pradesh.

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4. HOD, Department of Surgical Oncology, Mahatma Gandhi Cancer Hospital & Research Institute, Visakhapatnam, Andhra Pradesh.
5. Consultant Radiotherapy, Mahatma Gandhi Cancer Hospital and Research Institute, Visakhapatnam

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Kanhu Charan Patro,
HOD, Radiotherapy,
Mahatma Gandhi Cancer Hospital &
Research Institute,
MVP Colony, Visakhapatnam,
Andhra Pradesh.
E-mail:drkcpatro@gmail.com

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