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Incidence and outcome of benign bone tumor experience from tertiary care institute in central India

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Abstract

Purpose: Nonmalignant bone tumors represent a wide variety of different entities but maintain many common features. They usually affect young patients, and most can be diagnosed through imaging exams. Often asymptomatic, they can be discovered incidentally. Due to their similarities, these tumors may be challenging to diagnose and differentiate between each other, thus the need for a complete and clear description of their main characteristics. The advances in clinical and careful treatment modalities have brought about a major change in the prognosis of such benign harmful bone growths. The aim of this review is to give a picture of the benign bone tumors that clinicians can encounter more frequently in their everyday work and the management for the same.

Method: The study is Observational done in Sri Aurobindo Medical College and PG Institute, Indore using REST score to differentiate between benign and malignant tumours on radiograph.

Result: The Radiological Assessment Score for Bone Cancers (REST) is an organized revealing and objective technique for the evaluation of radiographs in patients with suspected bone growths. This strategy is a solid and accommodating instrument for clinicians in their outside understanding division to separate a radiograph of a speculated harmless growth from a dangerous bone cancer.

Implications: The study will prove useful to clinicians in their outpatient facility where using REST they will be able to differentiate between a speculated harmless growth from a malignant lesion.

Keywords: Rest, benign, tumor

Introduction

Harmless cancers are different cluster of clinical and neurotic organization ^[1]. Each growth has its own conduct and nature, accordingly respectability approach is needed in their analysis and therapy ^[2]. Primary bone growths are not normal on account of which there is deficiency of information about their relative recurrence, which helps in less understanding their danger factors. Cancers are age explicit, first pinnacle happened at second decade and one more at 6th decade. A large number of them are acquired and rest are created in relationship with non-neoplastic antecedents or in the setting of past harmless cancers. Lately, huge advances have happened in the sub-atomic and cytogenetic portrayal of harmless and dangerous bone growths. The location of clonal chromosomal variations, explicit sub-atomic hereditary changes, and the ID of development related growth cell flagging pathways have brought about a superior comprehension of the pathogenesis of a few neoplastic substances, and have given the premise to an improvement in the indicative workup and differential conclusion of a few bone cancers giving covering clinical, radiological and neurotic highlights, just as for the distinguishing proof of new prognostic variables and restorative targets.

The treatment of harmless bone growths is finished curettage and, normally, filling of the resultant depression with autologous or fake bone. Autologous or allogenic bone and substitutes are suggested over the utilization of fake bone because of their innate osteoconductive properties. Nonetheless, the gathering strategy is related with possible inconveniences and certain comorbidities, like hematoma, crack or torment at the contributor region. Hydroxyapatite (HA) and β -tricalcium phosphate (β -TCP) give a counterfeit option in contrast to autologous bone for uniting, taking out the potential confusions related with the bone gathering procedure.

Both of these counterfeit bone other options, in any case, have constraints that should be thought of. HA gives high introductory strength and unrivaled osteoconductive properties than β -TCP, yet isn't ingested and stays in bone. Then again, β -TCP is retained and supplanted by recently shaped bone, yet has lower beginning strength contrasted with HA. The underlying strength of a fake bone unite is related to its porosity and primary highlights. By and large, a unite with high porosity works with new bone development and vascularization, yet has low strength. To give satisfactory porosity and strength, we utilized unidi-rectional permeable β -tricalcium phosphate (UDPTCP) as a bone substitute after extraction of little bone growths.

Material and Methods

This is an observational study done in Sri Aurbindo Medical College and PG institute, Indore from April 2020. An ideal organizing framework ought to be useful, reproducible, and of prognostic importance. Malignant growth arranging is considered basic for infectious prevention in a singular patient and for the populace at large. As characterized by the Worldwide Association Against Disease, the goals of disease arranging are to help with arranging the course of treatment, (2) to give understanding into the visualization, (3) to help with assessing the consequences of treatment, (4) to work with powerful entomb institutional correspondence, and (5) to add to proceeding with examination of human malignancies [3]. By and large, careful resection has been the foundation for the board of outer muscle sarcomas. In this way the most valuable organizing framework would

direct the idea of the surgery. It additionally ought to (1) sort out the main prognostic elements into a framework depicting moderate levels of hazard to which a patient is oppressed, (2) diagram moderate phases of the sickness having explicit ramifications for careful administration, and (3) give rules to utilization of adjunctive treatment.

Enneking Staging System

There are separate staging systems for benign and malignant mesenchymal tumors. It is based on radiographic characteristics of the tumor host margin [4]. Well-demarcated borders are indicative of latent lesions whereas indistinct borders result from permeation into host bone and a more aggressive lesion [5]. For benign tumors, local aggressiveness and incidence of recurrence increase with increase in surgical grade. Metastases are rare for locally aggressive benign lesions but do rarely occur in giant cell tumor and chondroblastoma [6,7].

Stage	Description
Latent	Well-demarcated borders
Active	Indistinct borders
Aggressive	Indistinct borders

Inclusion criteria

- 1.) Benign tumor

Exclusion criteria

- 1. Malignant tumor
- 2. Absence of histopathological findings

Table 1: Radiological Evaluation Score for Bone Tumors (REST)

Radiological Evaluation Score for Bone Tumours (REST)				
Radiological finding	Interpretation	Score Zero(0)	Interpretation	Score One(1)
Characteristics of Tumour	Osteolytic	-	Osteoblastic/Mixed	1
Content of Tumour	Mineralization absent	-	Osteoid/Chondroid matrix	1
Cortical breach or involvement	Cortical erosion absent	0	Cortical erosion present	-
Distinctiveness	Well defined	-	Ill-defined	1
Distribution (Zone of transition)	Narrow zone of transition	-	Wide zone of transition	1
Periosteal reaction	Periosteal reaction absent or Benign type periosteal reaction	-	Malignant type of periosteal reaction (Codman's triangle, Onion peel, Sunray etc.)	1
Soft tissue mass	Soft tissue mass absent	-	Soft tissue mass present	1
Fracture	Pathological fracture absent	0	Pathological fracture present	-
Total Score (Minimum :0) (Maximum :8)		REST: 6 out of 8 (6/8)		
Interpretation		Score < 3 : Suggestive of Benign Bone tumour Score >= 3 : Suggestive of Malignant Bone tumour		

Pre-Op X-Ray

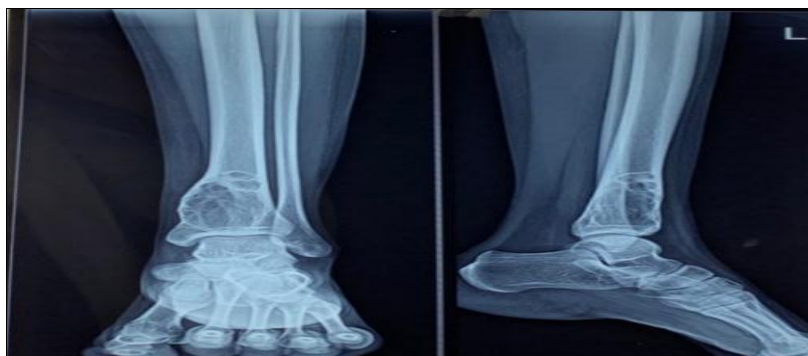


Fig 1: Showing Pre-Operative X-Ray Left Ankle AP and Lateral View Showing Well-Defined Expansile Lytic Lesion At Distal End Of Left Tibia Suggestive Of Giant Cell Tumor of Distal End Tibia

Pre-Op MRI



Fig 2: Showing Pre-Operative Mri Suggestive Of Well Defined Expansile Lytic Lesion Involving The Metaphysis Of Distal End Of Tibia Which Is Central Intramedullary In Location With Endo-Osteal Scalloping With Narrow Zone Of Transition And No Obvious Sclerosis.

Intra Op Images

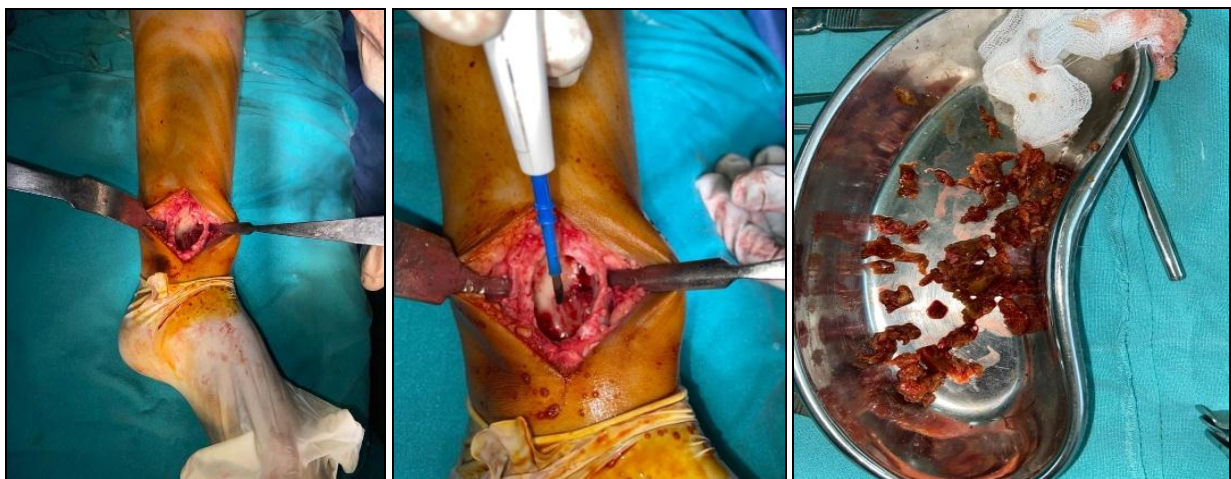


Fig 3: Showing Intra Operative Surgical Images of Giant Cell Tumour.-

Post Operative Xray



Fig 4: Showing Immediate Post-Operative X-ray 1 ½ Month Follow Up and 6 months follow up X-ray.

Results

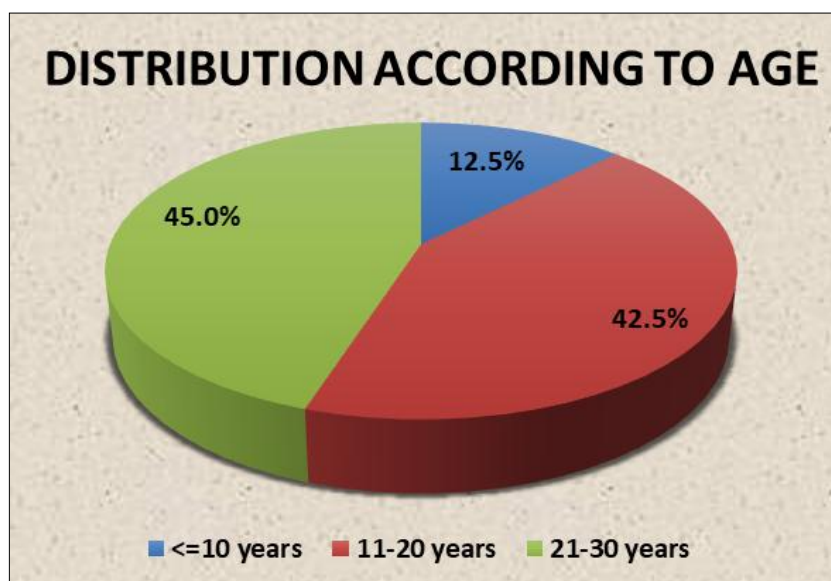
Essential harmful bone growths are uncommon and as such they address a troublesome classification of cancers for proper acknowledgment, order and treatment. Albeit the event of bone sarcomas is low, they influence especially kids and youths, which suggests that they significantly affect the existence of patients and their families. As of late, propels in clinical and careful treatment modalities have brought about an improvement of the result and endurance of essential harmful bone growths. This has been resembled by huge improvements in the sub-atomic and cytogenetic portrayal, which in mix with light/electron microscopy and immune-histo-chemical strategies, has contributed to a superior comprehension of this gathering of cancers. The Radiological Assessment Score for Bone Cancers (REST) is an organized revealing and objective technique for the evaluation of radiographs in patients with suspected bone

growths. This strategy is a solid and accommodating instrument for clinicians in their outside understanding division to separate a radiograph of a speculated harmless growth from a dangerous bone cancer.

Table 2: Distribution according to age

Age	Number	Percentage
<=10 years	5	12.5
11-20 years	17	42.5
21-30 years	18	45.0
Total	40	100.0

5 (12.5%) patients were in the age group <=10 years, 17 (42.5%) were in the age group 11-20 years and 18 (45%) were in the age group 21-30 years. The mean age was 18.90 ± 6.16 years (range: 5 to 30 years).

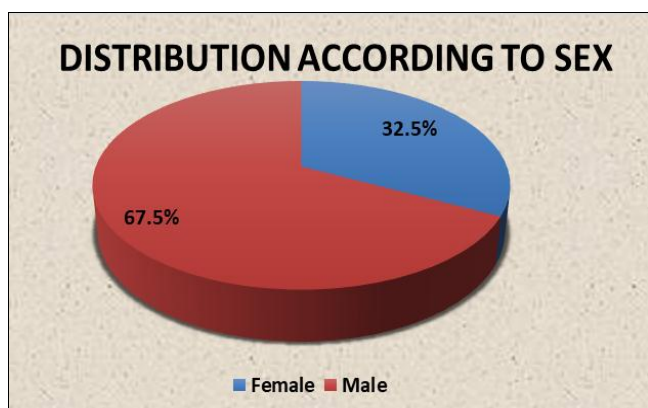


Graph 1: Pie diagram showing distribution according to age

Table 3: Distribution according to sex

Sex	Number	Percentage
Female	13	32.5
Male	27	67.5
Total	40	100.0

13 (32.5%) were females and 27 (67.5%) were males, showing a male predominance in the study.

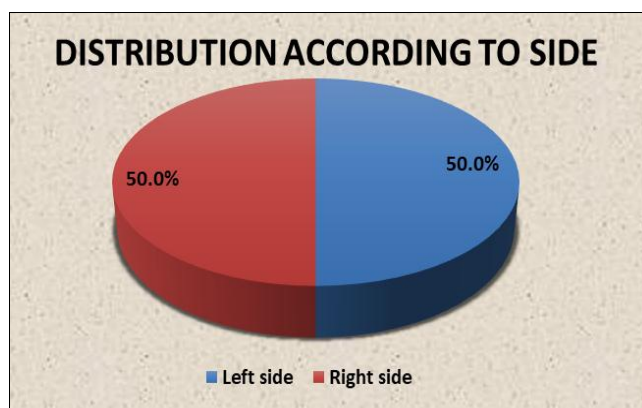


Graph 2: Pie diagram showing distribution according to sex

Table 4: Distribution according to side

Side	Number	Percentage
Left side	20	50.0
Right side	20	50.0
Total	40	100.0

20 (50%) patients had left side involvement and 20 (50%) patients had right side involvement.



Graph 3: Pie diagram showing distribution according to side

Table 4: Distribution according to procedure

Procedure	Number	Percentage
Biopsy	9	22.5
Biopsy and curettage	7	17.5
Bone curettage and excision	3	7.5
Bone tumor excision and bone grafting	4	10.0
Bone tumor excision and curettage	2	5.0
Bone tumor excision and curettage with fibular strut grafting	1	2.5
Incision and biopsy	2	5.0
Incisional biopsy	3	7.5
Incisional biopsy and curettage	3	7.5
Tumor excision	4	10.0
Tumor excision with extended curettage with GCL foam with bone grafting with bone cement(sandwich technique)	2	5.0
Total	40	100.0

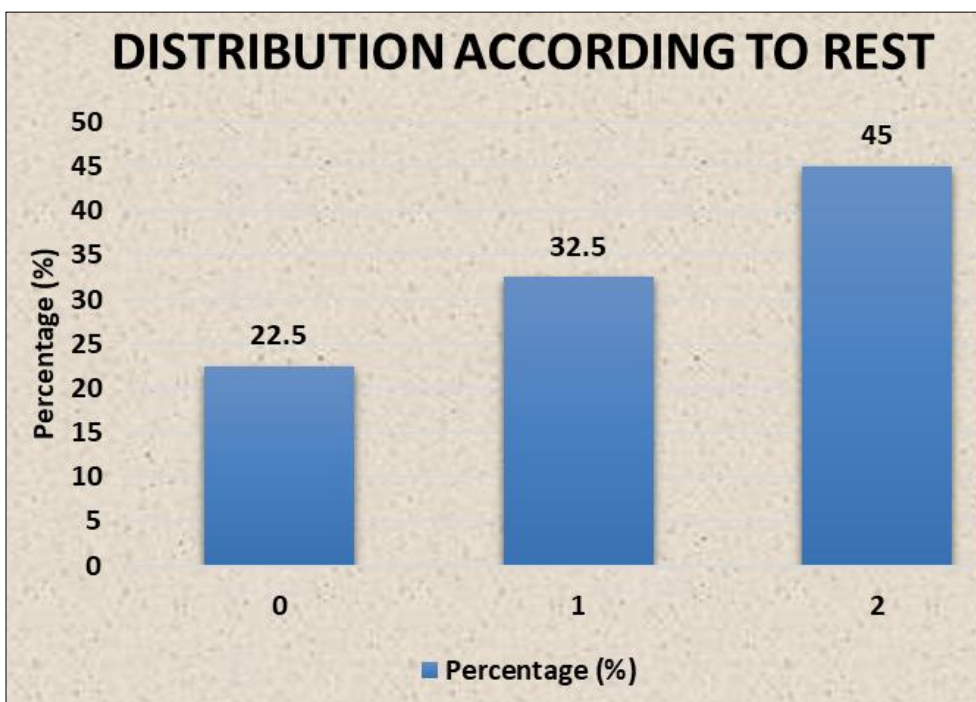
9 (22.5%) patients underwent biopsy, 7 (17.5%) underwent biopsy and curettage, 3 (7.5%) underwent bone curettage and excision, 4 (10%) underwent bone tumor excision and bone grafting, 2 (5%) underwent bone tumor excision and curettage, 1 (2.5%) underwent Bone tumor excision and curettage with fibular strut grafting, 2 (5%) underwent incision and biopsy, 3 (7.5%) underwent incisional biopsy, 3 (7.5%) underwent incisional biopsy and curettage, 4 (10%) underwent tumor excision and 2 (5%) underwent tumor excision with extended curettage with GCL foam with bone grafting with bone cement(sandwich technique).

Table 5: Distribution according to Radiological Evaluation Score for Bone Tumors (REST)

Rest value	Number	Percentage
0	9	22.5
1	13	32.5
2	18	45.0
Total	40	100.0

According to radiological evaluation score for bone tumor (REST), 9 (22.5%) patients had grade 0, 13 (32.5%) patients had grade 1 and 18 (45%) patients had grade 2.

All the patients had REST grade less than 3, suggestive of benign bone tumor.



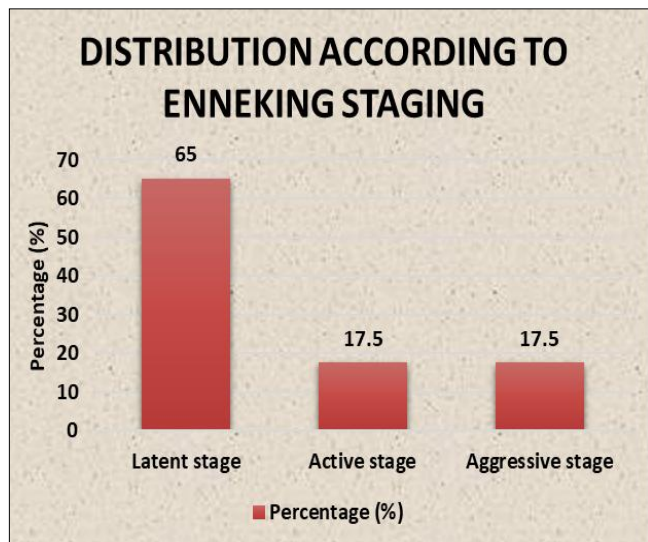
Graph 4: Bar diagram showing distribution according to REST

Table 6: Distribution according to Enneking Staging

Enneking Staging	Number	Percentage
Latent stage	26	65.0
Active stage	7	17.5
Aggressive stage	7	17.5
Total	40	100.0

According to Enneking Staging, 26 (65%) patients were in latent stage, 7 (17.5%) patients were in active stage and 7

(17.5%) patients were in aggressive stage. Majority of the patients were in latent stage.

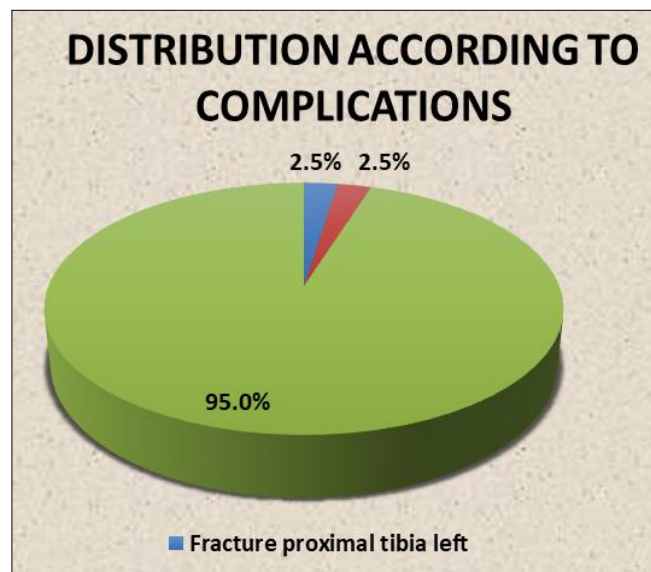


Graph 5: Bar diagram showing distribution according to Enneking staging

Table 7: Distribution according to complications

Complications	Number	Percentage
Fracture proximal tibia left	1	2.5
Infection	1	2.5
No complications	38	95.0
Total	40	100.0

There were only 2 complications seen in the study. 1 (2.5%) patient had fracture proximal tibia left and 1 (2.5%) patient had infection. 38 (95%) patients had no complications.

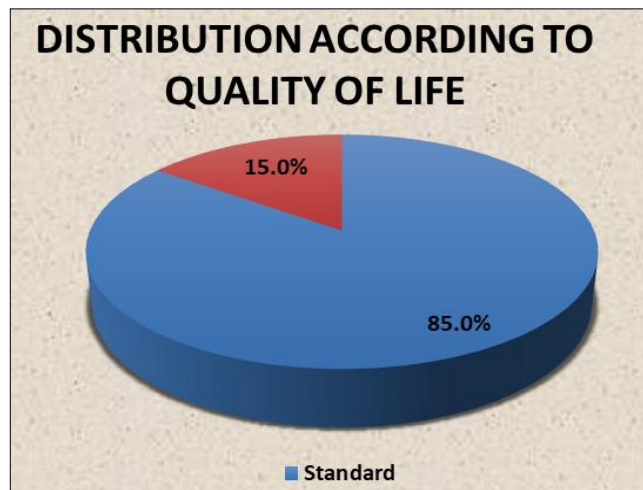


Graph 6: Pie diagram showing distribution according to complications

Table 8: Distribution according to quality of life

Quality of Life	Number	Percentage
Standard	34	85.0
High	6	15.0
Total	40	100.0

34 (85%) patients had standard quality of life and 6 (15%) patients had high quality of life.



Graph 7: Pie diagram showing distribution according to quality of life

Table 9: Association between REST and quality of life

REST	Quality of Life		Total
	Standard	High	
0	9 100.0%	0 0.0%	9 100.0%
1	8 61.5%	5 38.5%	13 100.0%
2	17 94.4%	1 5.6%	18 100.0%
Total	34 85.0%	6 15.0%	40 100.0%

Pearson chi-square test applied.

Chi-square test value = 8.460, df=2, P value = 0.015, Significant

There was a statistically significant association between REST and the quality of life (P=0.015), showing that quality of life is dependent on REST.

In REST grade 1, high quality of life was seen in 5 (38.5%) patients, while in REST grade 2, only 1 (5.6%) patient had high quality of life. In REST grade 0 none of the patients had high quality of life.

Table 10: Association between sex and quality of life

Sex	Quality of Life		Total
	Standard	High	
Female	8 61.5%	8 38.5%	13 100.0%
Male	26 96.3%	1 3.7%	27 100.0%
Total	34 85.0%	6 15.0%	40 100.0%

Pearson chi-square test applied.

Chi-square test value = 8.315, df=1, P value = 0.004, Significant

There was a statistically significant association between sex and the quality of life (P=0.004), showing that quality of life is dependent on sex of the patients.

In females, 8 (38.5%) had high quality of life, while in males only 1 (3.7%) had high quality of life.

Discussion

This review, we proposed a scoring framework for surveying a radiograph of a patient with a speculated bone growth, with a Radiological Evaluation Score for Bone Tumors (REST). Supposedly, this would be a clever way to deal with evaluate a radiograph of a patient with a presumed bone sore for

separating a harmless growth from a threatening cancer. In the current score, we have included eight radiological boundaries [characteristics, content, cortical break, peculiarity, circulation, periosteal response, crack, and delicate tissue swelling] and approved it on 40 patients with essential bone growths. No distinctions were seen between the gauge attributes of the patients between the harmless and threatening cancer gatherings. There was, nonetheless, a huge distinction in the REST score between gatherings. The current review was valuable in recognizing patients with a dangerous bone sore, with a REST of > 3 fundamentally prescient of a threatening bone sore, and a score ≤ 3 would probably be a harmless cancer. The presence of higher REST had a higher shot at being a threatening bone growth. Right now, there are a shortfall of a normalized technique and an absence of appropriate assessment of plain radiographs which might prompt a higher shot at missing the determination of threatening bone growths. The essential goal of REST is to sharpen clinicians about the chance of a conclusion of a dangerous bone sore. A few reports have been distributed in the clinical writing on misdiagnosing essential bone sarcoma as a harmless bone growth and treated with intra-lesional methodology without fitting imaging studies, biopsy, and organizing examinations. Ayerza *et al.* revealed an audit of 117 patients with osteosarcoma out of which cases were misdiagnosed as harmless bone growths in 7% and osteomyelitis in 1.7%. In a concentrate by Jeon *et al.* on 25 patients with essential bone sarcoma treated with impromptu intra-lesional strategies, mistaken analyses of the harmless growth were seen in 68% of cases and osteomyelitis in 28% cases.

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