

PERBANDINGAN AKURASI *RADIOLOGICAL EVALUATION SCORE FOR BONE TUMORS (REST)* DAN *AMERICAN COLLEGE OF RADIOLOGY BONE REPORTING AND DATA SYSTEM (ACR BONE-RADS)* PADA RADIOGRAFI KONVENSIONAL TUMOR TULANG JINAK DAN GANAS

Ahmad Faiz¹, Lina Choridah², Hesti Gunarti², Sudarmanta², Yana Supriatna²

¹Residen; ²Staf Pengajar Departemen Radiologi,
Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan,
Universitas Gadjah Mada/Rumah Sakit Umum Pusat Dr. Sardjito, Daerah Istimewa
Yogyakarta, Indonesia

INTISARI

Latar Belakang: Interpretasi radiografi konvensional pada tumor tulang sering bersifat subjektif dan menimbulkan variasi antar pemeriksa. Sistem penilaian terstruktur seperti REST dan ACR *Bone-RADS* dikembangkan untuk meningkatkan objektivitas, namun perbandingan akurasi keduanya masih terbatas.

Tujuan: Menilai dan membandingkan akurasi diagnostik REST dan ACR *Bone-RADS* dalam membedakan tumor tulang jinak dan ganas pada radiografi konvensional, serta mengidentifikasi parameter REST yang bermakna terhadap keganasan.

Metode: Penelitian uji diagnostik potong lintang retrospektif ini melibatkan 129 pasien dengan hasil histopatologi tumor tulang di RSUP Dr. Sardjito. Tiga radiolog independen menilai skor REST dan ACR *Bone-RADS* pada radiografi konvensional. Analisis meliputi uji reliabilitas *Fleiss' Kappa* dan *Intraclass Correlation Coefficient (ICC)*, kurva *Receiver Operating Characteristic (ROC)*, perbandingan *Area Under the Curve (AUC)* dengan uji DeLong, *cut-off* skor dengan indeks Youden, akurasi, sensitivitas, spesifisitas, serta regresi logistik multivariat untuk menentukan parameter REST yang signifikan.

Hasil: Reliabilitas *interobserver* skor REST dan ACR *Bone-RADS* sangat baik (ICC > 0,9) dengan sebagian besar parameter menunjukkan tingkat kesepakatan hampir sempurna (Kappa > 0,8), kecuali erosi korteks (Kappa = 0,349), *margin* (Kappa = 0,609), dan erosi *endosteal* (Kappa = 0,528). REST menunjukkan AUC 0,848 dan ACR *Bone-RADS* 0,808 tanpa perbedaan bermakna ($p = 0,161$). *Cut-off* skor REST ≥ 4 memberikan sensitivitas 72,2%, sedangkan *cut-off* optimal ACR *Bone-RADS* adalah skor 4. REST lebih spesifik (85,3%), sedangkan ACR *Bone-RADS* lebih sensitif (85,2%). Analisis multivariat mengidentifikasi reaksi *periosteal* sebagai parameter REST yang berhubungan signifikan dan independen dengan keganasan ($p = 0,006$; OR = 9,49).

Kesimpulan: REST dan ACR *Bone-RADS* memiliki akurasi diagnostik yang setara dalam membedakan tumor tulang jinak dan ganas. Reaksi *periosteal* merupakan prediktor independen terhadap keganasan.

Kata kunci: REST, ACR *Bone-RADS*, tumor tulang, radiografi konvensional, akurasi diagnostik

DIAGNOSTIC ACCURACY COMPARISON OF RADIOLOGICAL EVALUATION SCORE FOR BONE TUMORS (REST) AND AMERICAN COLLEGE OF RADIOLOGY BONE REPORTING AND DATA SYSTEM (ACR BONE-RADS) ON CONVENTIONAL RADIOGRAPHY FOR BENIGN AND MALIGNANT BONE TUMORS

Ahmad Faiz¹, Lina Choridah², Hesti Gunarti², Sudarmanta², Yana Supriatna²

¹Resident; ²Teaching Staff of Department of Radiology, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University/Dr. Sardjito General Hospital, Special Region of Yogyakarta, Indonesia

ABSTRACT

Background: Interpretation of conventional radiographs in bone tumors often involves subjectivity and interobserver variability, which may affect diagnostic accuracy. Structured scoring systems such as the REST and the ACR Bone-RADS were developed to enhance objectivity and reproducibility; however, direct comparisons of their diagnostic accuracy remain limited.

Objective: To evaluate and compare the diagnostic accuracy of REST and ACR Bone-RADS in differentiating benign and malignant bone tumors on conventional radiographs, and to determine significant REST parameters associated with malignancy.

Methods: This retrospective cross-sectional diagnostic study involved 129 patients with histopathologically confirmed bone tumors at Dr. Sardjito General Hospital. Three independent radiologists assessed REST and ACR Bone-RADS scores using conventional radiographs. Analyses included interobserver reliability using Fleiss' kappa and Intraclass Correlation Coefficient (ICC), Receiver Operating Characteristic (ROC) curves, Area Under the Curve (AUC) comparison with the DeLong test, score cut-off determination using Youden's index, diagnostic accuracy, sensitivity, specificity, and multivariate logistic regression to determine significant REST predictors.

Results: Interobserver reliability for both REST and ACR Bone-RADS was excellent (ICC > 0.9), with most parameters showing almost perfect agreement (Kappa > 0.8) except for cortical erosion (Kappa = 0.349), margin (Kappa = 0,609) and endosteal erosion (Kappa = 0.528). REST achieved an AUC of 0.848 and ACR Bone-RADS 0.808, with no significant difference (p = 0.161). The optimal REST cut-off score ≥ 4 yielded 72.2% sensitivity, while the optimal ACR Bone-RADS cut-off score was 4. REST demonstrated higher specificity (85.3%), whereas ACR Bone-RADS was more sensitive (85.2%). Multivariate analysis identified periosteal reaction as the only REST parameter significantly and independently associated with malignancy (p = 0.006; OR = 9.49).

Conclusion: Both REST and ACR Bone-RADS demonstrated comparable diagnostic accuracy in differentiating benign and malignant bone tumors on conventional radiographs. Periosteal reaction was the only parameter significantly associated with tumor malignancy.

Keywords: REST, ACR Bone-RADS, bone tumor, conventional radiography, diagnostic accuracy