

INTISARI

PERBEDAAN INTENSITAS SINYAL VERTEBRAL METASTASIS DAN CORPUS VERTEBRA NORMAL PADAT2WI MDIXON *IN PHASE* DAN *OUT OF PHASE*

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Pendahuluan : Tulang belakang adalah lokasi ketiga yang paling umum untuk metastasis, setelah paru-paru dan hati. Tumor-tumor pada mammae, prostat dan pulmo menyumbang lebih dari 80% dari vertebral metastasis. Secara umum, prognosis untuk pasien dengan metastasis tulang buruk. Metastasis tulang dapat berupa lesi osteolitik atau osteoblastik. Pada metastasis osteolitik corpus vertebra memiliki kecenderungan mengalami destruksi fraktur patologis dibandingkan metastasis osteoblastik.

Tujuan : mengetahui perbandingan penurunan intensitas sinyal lesi metastasis osteolitik dengan struktur corpus vertebra normal pada MRI sekuens T2 mDixon *In Phase* dengan *Out of Phase*.

Bahan dan Cara : Penelitian retrospektif dengan sampel penelitian berupa data sekunder citra MRI vertebra sekuens konvensional dan T2 mDixon OP (*opposed phase*) /IP (*inphase*) RSUP Dr. Sardjito Januari 2019 – November 2019 yang memenuhi kriteria inklusi dan eksklusi dengan suspek vertebral metastasis dan kontrol pasien normal. Pada pemeriksaan MRI vertebra T2W mDixon dilakukan pengukuran intensitas sinyal lesi osteolitik vertebral metastasis dengan kelompok kontrol dengan corpus vertebra pasien normal. Analisis komparatif nilai rasio intensitas sinyal OP /IP. *Reference standard* menggunakan konsensus panel dokter radiologi.

Hasil : Pada sekuens T2 mDixon rerata nilai intensitas sinyal IP pada corpus vertebra non metastasis sebesar 757, vertebral metastasis 764 dan vertebral metastasis oleh ca mammae sebesar 774. Pada sekuens T2 mDixon *outphase* didapatkan rerata nilai intensitas sinyal pada corpus vertebra non metastasis sebesar 203 ± 14 , rerata vertebral metastasis 764 ± 195 , sedangkan pada vertebral metastasis oleh ca mammae sebesar 628 ± 195 . Nilai rasio OP/IP corpus vertebra non metastasis sebesar 0,26 dan vertebral metastasis 0,80 dan vertebral metastasis oleh ca mammae sebesar 0,80. Didapatkan $p < 0,05$ pada analisa komparatif rerata rasio OP/IP antara kelompok normal vs vertebral metastasis. Didapatkan AUC (Area Under Curve) sebesar 1 untuk rasio OP/IP, *outphase* sebesar 0,987, *inphase* berada di bawah 0,5 untuk normal vs vertebral metastasis. Didapatkan *cut off point* OP 372,5 sensitivitas 92,4%, spesifitas sebesar 95,9 %. nilai *cut off* rasio OP/IP sebesar 0,56 dengan nilai sensitivitas 100% dan spesifitas 100 %.

Kesimpulan : Terdapat penurunan intensitas sinyal pada hasil pencitraan MRI sekuens T2 mDixon fase OP terhadap IP corpus vertebra pada lesi osteolitik lebih rendah daripada non metastasis. Nilai intensitas sinyal sekuens T2 mDixon *outphase* dan rasio nilai OP/IP memiliki nilai diagnostik untuk vertebral metastasis dengan lesi osteolitik.

Kata kunci : vertebra, osteolitik, MRI, T2W, mDixon, *Outphase OP*, *Inphase IP*

ABSTRACT

COMPARATION OF SIGNAL INTENSITY FROM VERTEBRAL METASTASES AND NORMAL VERTEBRA IN MRI T2WI MDIXON IN PHASE AND OUT OF PHASE

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Introduction: The spine is the third most common location for metastases, after the lungs and liver. breast, prostate and lung cancer account for more than 80% of vertebral metastases. In general, patients with bone metastases have poor prognosis. Bone metastases can present as osteolytic or osteoblastic lesions. Osteolytic vertebral metastases are frequently associated with pathological fracture destruction compared to osteoblastic metastases.

Objective: to compare signal intensity reduction in osteolytic metastatic lesions with normal vertebrae on MRI sequences T2 mDixon In Phase with Out of Phase.

Materials and Methods: A retrospective study with a research sample from secondary data January 2019 - November 2019 with conventional MRI spine imaging and fat suppression technique T2 mDixon OP (opposing phase) / IP (inphase) in Dr. Sardjito General Hospital Yogyakarta that fulfilled the inclusion and exclusion criteria. Data was obtained with measuring signal intensity on T2W mDixon sequence of the metastatic osteolytic lesions at the vertebral body for the interest group, and at the normal vertebral body for the control group. Comparative analysis of OP / IP signal intensity ratio was used with reference standards by a panel of radiologist consensus.

Results: On the average T2 mDixon sequence, the value of IP signal intensity in normal vertebrae was 757, vertebral metastases 764 and vertebral metastases by breast cancer was 774. In T2 mDixon outphase sequences, the average value of signal intensity in normal vertebrae was 203 ± 14 , vertebral metastases 764 ± 195 , while in vertebral metastases by breast cancer was 628 ± 195 . The OP / IP ratio of normal spine is 0.26, vertebral metastases is 0.80 and vertebral metastases by breast cancer is 0.80. Obtained $p < 0.05$ in the comparative analysis of the mean OP / IP ratio between the normal vs vertebral metastases groups. Obtained an AUC (Area Under Curve) of 1 for the OP / IP ratio, an outphase of 0.987, inphase below 0.5 for normal vs vertebral metastases. The cut off point of OP 372.5 obtained 92.4% sensitivity, the specificity of 95.9%. The cut off value of the OP / IP ratio was 0.56 with a sensitivity value of 100% and a specificity of 100%.

Conclusion: The signal intensity on the MRI imaging results using T2 mDixon OP and IP phase sequence is lower in osteolytic lesions compared to the control group. The value of the signal intensity of the T2 mDixon outphase sequence and the ratio of OP / IP values have a diagnostic value for vertebral metastases with osteolytic lesions.

Keywords: vertebra, osteolytic, MRI, T2W, mDixon, Outphase OP, IP Inphase