

# Differentiation of a rib benign lesion from a metastasis using xSPECT Quant

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Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland



- 1 A posterior planar whole-body image demonstrates a small focal area of slightly increased uptake in the posterior arch of the left ninth rib, which appears suspicious considering the patient's history of prostate cancer. The intensity of uptake is low and such solitary focal rib lesions are commonly related to trauma or benign conditions.

Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.

## History

A 58-year-old patient with prostatic hypertrophy underwent a prostatectomy, which led to an incidental discovery of adenocarcinoma of the prostate that was staged at T2c N0 M0 with a Gleason score of 7 = 3 + 4.

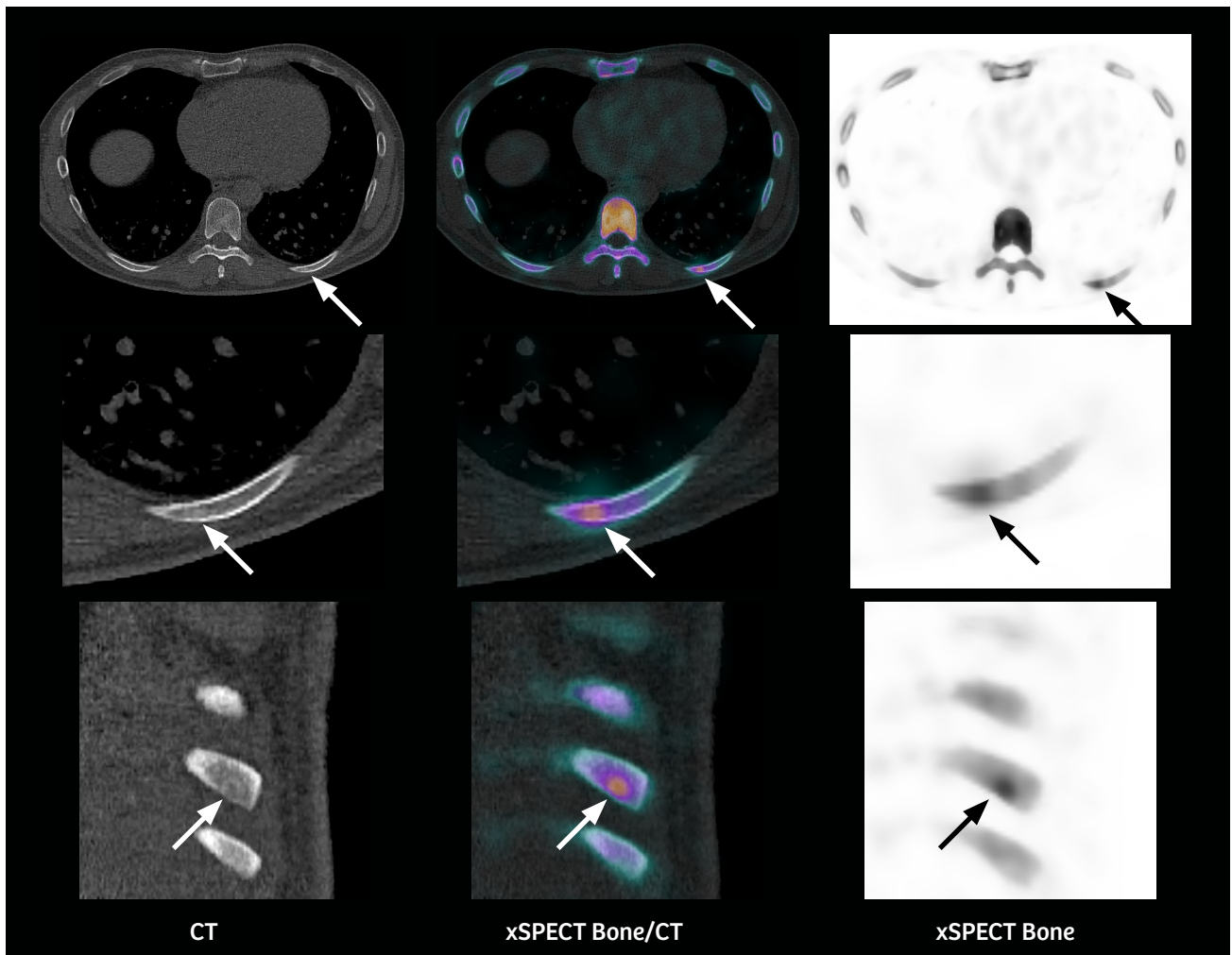
As part of the initial staging, a  $^{99m}\text{Tc}$  DPD bone scan was performed on a Symbia Intevo™ 16 SPECT/CT. Three hours following intravenous (IV) administration of 18.9 mCi (700 MBq) of  $^{99m}\text{Tc}$  DPD, initial planar acquisitions were conducted in the anterior and posterior views. A subsequent SPECT/CT examination using xSPECT Bone™ and xSPECT Quant™ was administered for the thorax.

Although the low intensity of uptake and the solitary nature of the rib lesion is suggestive of a benign origin, the patient's history of prostate cancer was cause for suspicion. The SPECT/CT and xSPECT Quant findings were reviewed for better characterization of the rib lesion.



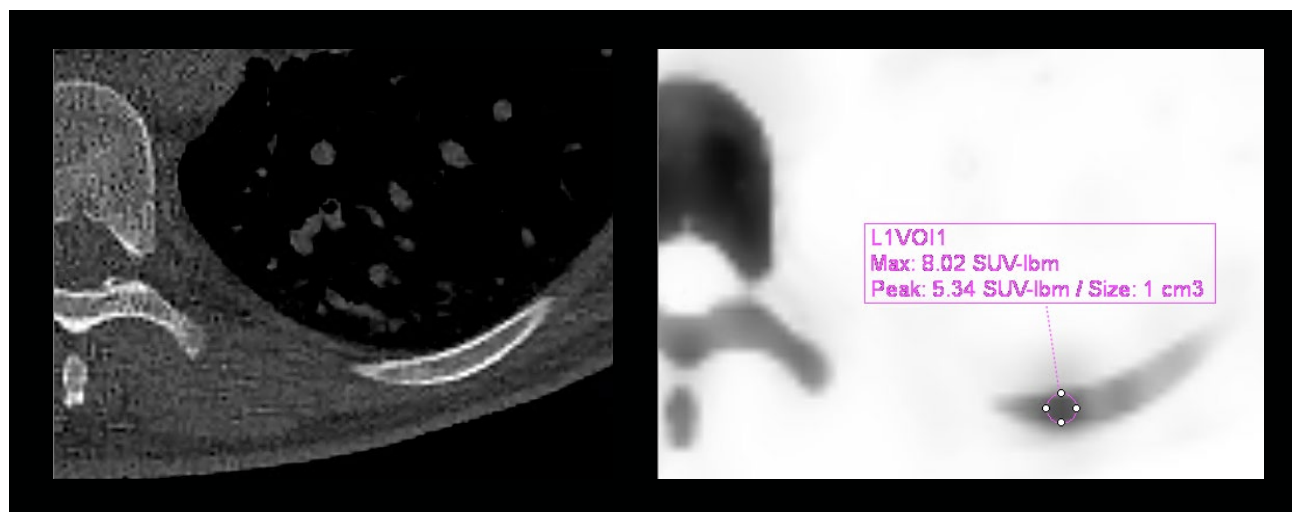
- 2 Posterior projection of the MIP image of xSPECT Bone reconstruction of the thorax shows sharp delineation of focal hot area in the left ninth rib posteriorly. Note the overall sharp margins of the ribs and vertebrae seen with xSPECT Bone.

Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.



- 3 CT, fused SPECT/CT, and xSPECT Bone images in axial and coronal orientation show focal area of mild hypermetabolism in the posterior arch of left ninth rib (arrows). The CT images show a well circumscribed rib lesion without bony expansion or periosteal thickening.

Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.



4 Zoomed CT, xSPECT Bone, and xSPECT Quant images show SUV<sub>max</sub> of 8.02 in the lesion in left ninth rib.

Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.

## Findings

Quantitative SPECT/CT (Figure 4) demonstrated focal uptake in the left ninth rib, with a SUV<sub>max</sub> of 8.02 mg/mL. The results correspond to an intramedullary lesion, without a sign of aggressive growth seen on CT (no cortical rupture or periosteal apposition), most likely of cartilaginous origin.

CT findings of an intramedullary lesion—without cortical erosion or periosteal reaction and thickening—along with the relatively low uptake of <sup>99m</sup>Tc DPD and low SUV observed on xSPECT Quant (< 20 mg/mL),<sup>1</sup> were suggestive of a benign origin, most likely an enchondroma. Other possibilities included bone dysplasia or the sequelae of a previous bone infarction. Post-operative follow-up showed a non-detectable serum level of prostate-specific antigen (PSA) (< 0.03 ng/mL). The patient maintains a non-detectable PSA level from date to 16 months after surgery (latest follow-up date).

## Comments

Solitary rib lesions seen in bone scintigraphy are commonly secondary to trauma or benign pathology, even in

patients with known malignancy. However, the intensity of uptake and CT findings within the lesion are vital to the accurate characterization of such lesions. In this patient, the focal lesion in the left ninth rib showed low intensity of uptake and a low SUV<sub>max</sub> of 8.02 with CT findings of a well-circumscribed intramedullary rib lesion without bony expansion, cortical erosion, or periosteal thickening. CT findings—along with low uptake intensity and low SUV<sub>max</sub> related to a relatively minor level of skeletal hypermetabolism—were all suggestive of a benign origin of the rib lesion, which was deemed an enchondroma. The patient continues to maintain an undetectable level of serum PSA, thus confirming the absence of functioning metastases. xSPECT Quant enabled the estimation of lesion SUV<sub>max</sub>, which was significantly below the usual levels seen in malignant lesions, thus supporting the diagnosis of a benign enchondroma.<sup>1</sup>

## Conclusion

Low SUV<sub>max</sub> in a suspicious focal rib lesion, obtained from xSPECT Quant in combination with CT information, helped in the diagnosis of a benign enchondroma in a patient with known prostate cancer. ●

## References

<sup>1</sup> Threshold based on unpublished institutional research data: Tabotta F, Jreige M, Schaefer N, Prior JO, Nicod-Lalonde M. Tc-99 DPD bone scan quantification: metastasis of prostate cancer versus osteoarthritis. Oral communication. 30th Annual Congress of the European Association of Nuclear Medicine, Vienna; October 2017.

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## Examination protocol

### Scanner: Symbia Intevo 16

SPECT	
Injected dose	18.9 mCi (700 MBq)
Acquisition	60 stops at 10 seconds/stop
CT	
Tube voltage	130 kV
Tube current	30 eff mAs
Slice thickness	3 mm

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