PSMA PET/CT Interpretation Pitfalls

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INTRODUCTION

The PSMA PET/CT is increasingly used in the evaluation of prostate cancer. However, PSMA is expressed physiologically in non-prostatic tissues, as well as in other pathological conditions.

This is an educational case-based approach aiming to illustrate the variation in physiological distribution of the PSMA activity and uptake in various benign and neoplastic disorders that may be misinterpreted as prostatic metastatic disease.

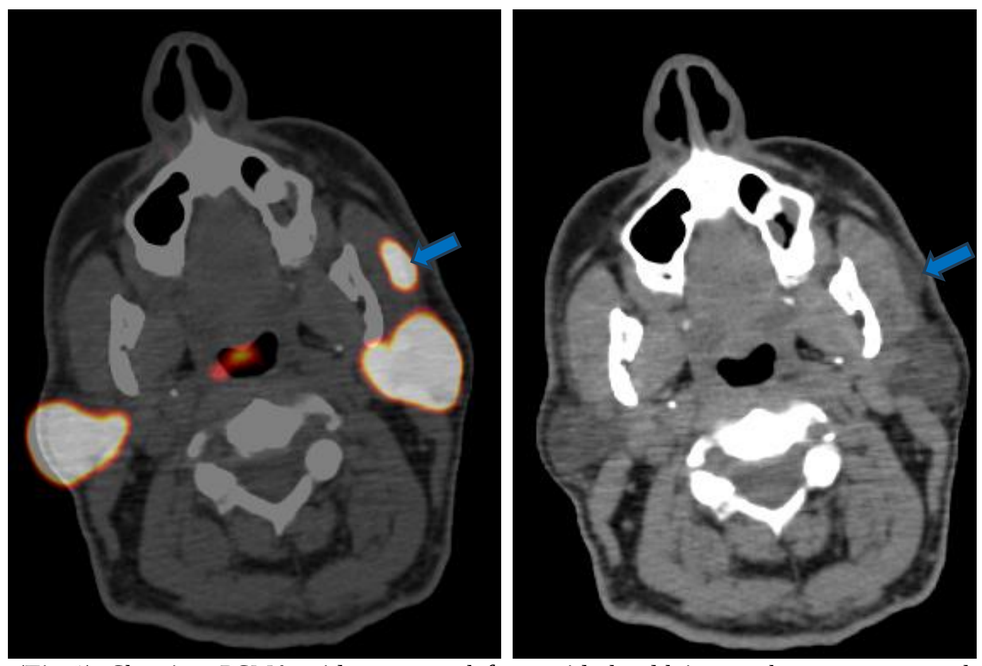
This is to increase the awareness to aid in more accurate interpretation of the PSMA PET/CT.

Objectives and methods

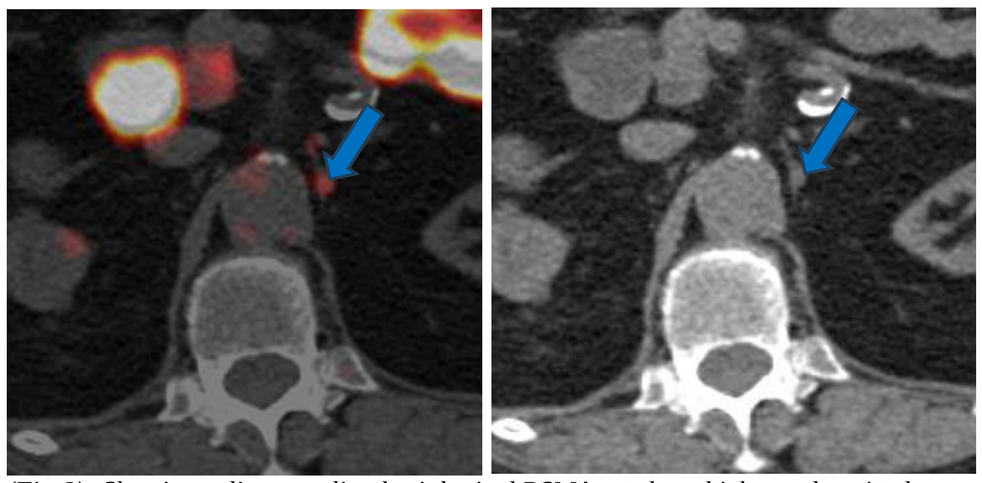
In this educational case-based approach the variation in physiological distribution of the PSMA activity and uptake in various benign and neoplastic disorders will be illustrated to avoid misinterpretation as prostatic metastatic disease, increasing the awareness and aiding in more accurate interpretation of the PSMA PET/CT.

To be able to differentiate :

1- Structures with physiological PSMA uptake which may be mistaken as metastatic lesions, like celiac ganglia, accessory parotid gland, etc...

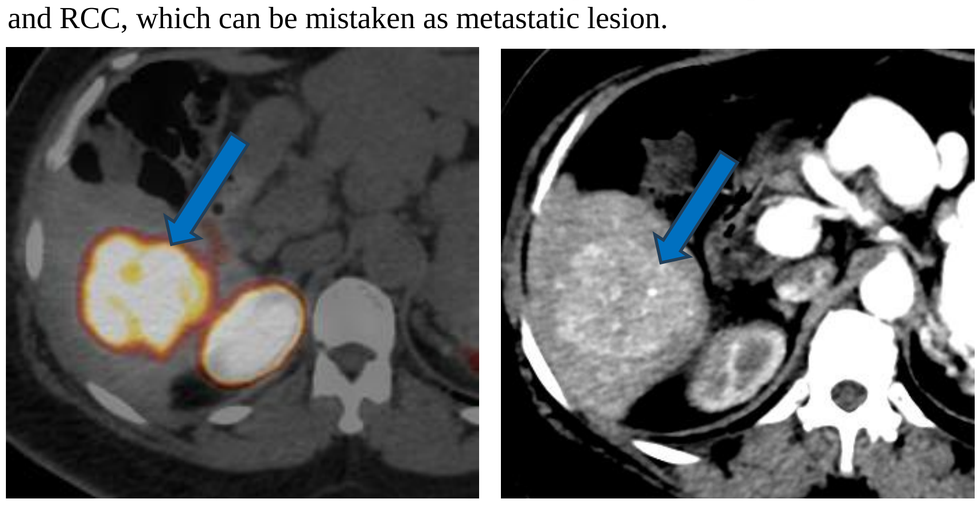


(Fig:1): Showing PSMA avid accessory left parotid gland lying on the masseter muscle anterior to the parotid gland.



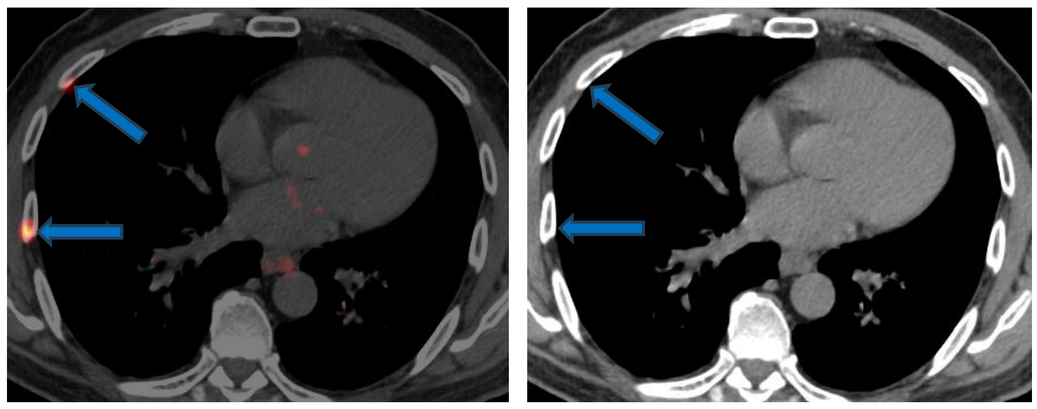
(Fig:2): Showing celiac ganglia physiological PSMA uptake, which may be mistaken as nodal metastasis.

2- Non metastatic active lesions with PSMA uptake in other primaries like HCC and RCC, which can be mistaken as metastatic lesion.



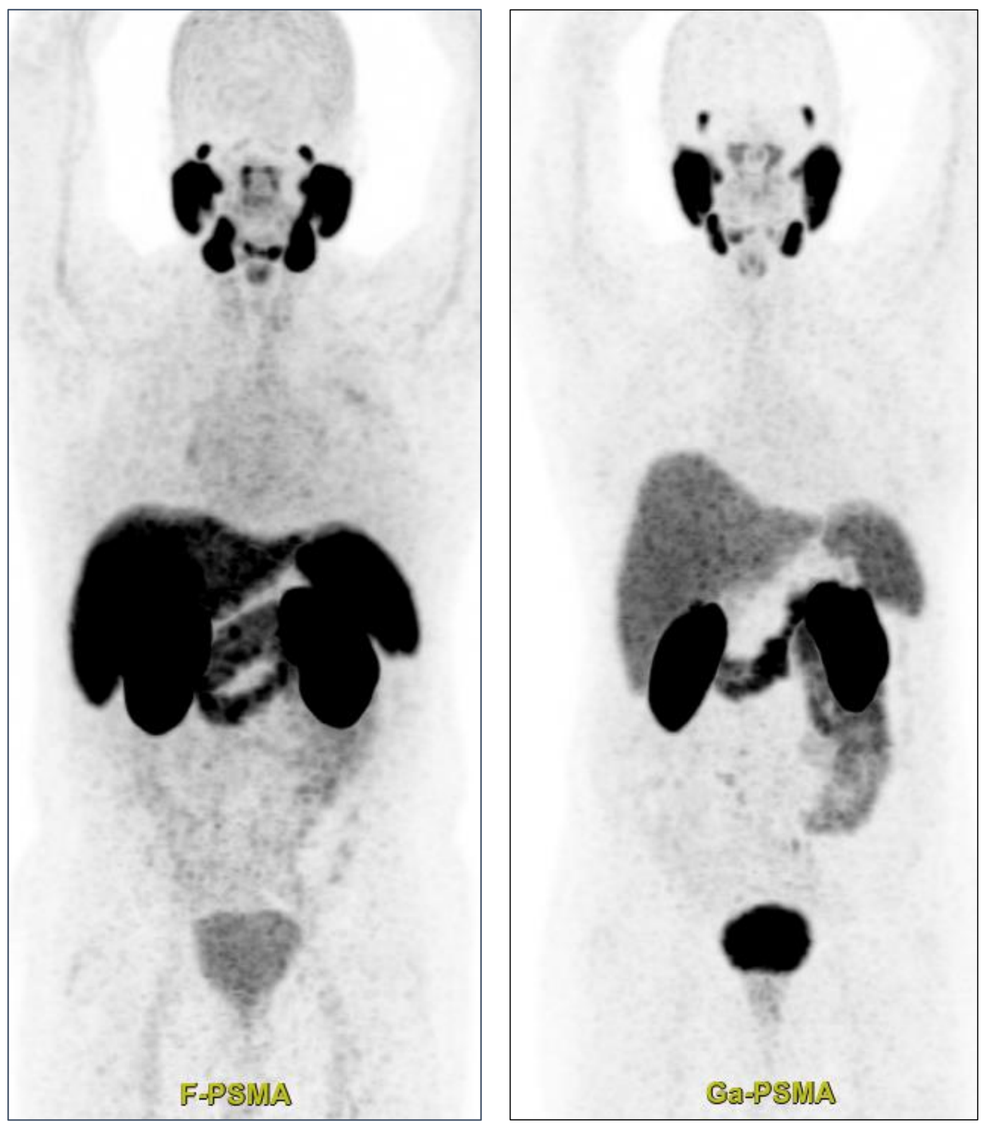
(Fig:3): Showing intensely PSMA avid Hepatocellular carcinoma (HCC).

3- False positive PSMA uptake in non metastatic bony lesions as Paget's disease of the bone and isolated rib PSMA avid lesions “when using both ^{68}Ga and ^{18}F PSMA tracers” and in bony hemangiomas “when using ^{18}F-PSMA tracer”.



*(Fig:4): Showing **isolated** ribs PSMA avid lesions in a patient with recently diagnosed prostate cancer, which should not be mistaken as metastatic lesions.*

To understand the difference between ^{18}F and ^{68}Ga PSMA tracers and pattern of excretion of each tracer, as ^{18}F-PSMA has predominant hepato-biliary excretion, unlike ^{68}Ga-PSMA which has predominant urinary excretion.



(Fig:5): Showing the difference between ^{18}F and ^{68}Ga PSMA tracers.

CONCLUSION

Prostate cancer (PCa) management has been revolutionized with the advent of prostate-specific membrane antigen (PSMA) positron emission tomography (PET) imaging.

Despite the name, PSMA is not exclusive to prostate cancer, but instead, is expressed in a range of different structures and lesions, both physiologic and pathologic.

This case-based approach Illustrated the different pitfalls in PSMA PET/CT interpretation, highlighting the variation in physiological distribution of PSMA activity and uptake in various benign and neoplastic conditions to prevent misinterpretation of such conditions as metastatic prostatic disease.

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