

## Female Neonate Breasts Tc-99m Pertechnetate Uptake

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### Abstract

This is an unusually encountered imaging finding on tc-99m pertechnetate thyroid scintigraphy for a female neonate. The study goal is further assessment of thyroid function test derangement that was identified in the routine well baby clinic screening. Neonatal breasts focal symmetrical tc-99m pertechnetate uptake was incidentally depicted. Tc-99m pertechnetate cellular uptake depends on the transmembrane sodium-iodide symporter mechanism and this is normally present in breast tissues. Maternal lactogenic hormones transplacental transportation leads to enhancement of the transmembrane sodium-iodide symporter mechanism (1, 2, 3). This transplacental hormonal transportation with resultant transmembrane sodium-iodide symporter mechanism enhancement are the reasons behind we have surprisingly seen in this thyroid scan.

### INTRODUCTION

Tc-99m pertechnetate ( $\text{Na}^{+99\text{m}}\text{TcO}_4^-$ ) is one of the technetium radiopharmaceuticals, which can be used for thyroid imaging, parathyroid subtraction technique, Meckel's diverticulum diagnosis and testicular scintigraphy. Tc-99m pertechnetate has a photon energy of 140 keV and a physical half-life of 6 hours. Stomach, thyroid and salivary glands and testicles reveal normal physiological tc-99m pertechnetate uptake while its excretion is via genitourinary and gastrointestinal tracts.

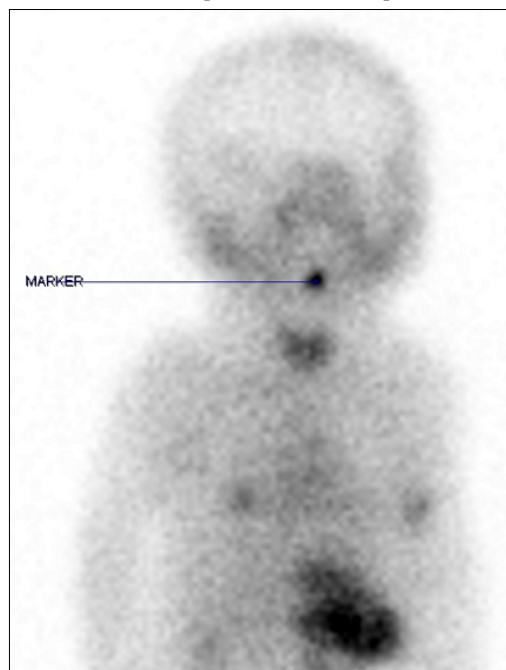
### CASE PRESENTATION

This is a female neonate who was found to have a significantly increased TSH level measuring 7.684 uIU/mL along with high T4 value, which measures 25.3 pmol/L in her routine well baby clinic laboratory investigations.

On physical examination: the patient was well, active and alert; she was not pale, jaundiced or cyanosed, vitally stable with no dysmorphic features and the systemic evaluation was unremarkable.

Thyroid gland ultrasound scanning was performed demonstrating no gross abnormality. Thyroid gland scintigraphy utilizing tc-99m pertechnetate was done showing normal thyroid gland location which has bilobed butterfly configuration displaying

homogenous activity and the thyroid gland uptake was within normal limits. Normal physiological activity was noted in the stomach and salivary glands as well. However, there was unexpected breasts focal symmetrical tc-99m pertechnetate uptake.



Tc-99m pertechnetate thyroid scan: normal thyroid gland uptake. Normal physiological gastric and salivary glands activity. Incidental finding of bilateral breast focal symmetrical pertechnetate uptake.

### DISCUSSION

Pertechnetate anion uptake in breast epithelial cells is mediated by transmembrane sodium-iodide symporter that is normally present in these tissues (4, 5). Many in vitro and in vivo studies have shown that lactogenic hormones such as, prolactin, estrogen and oxytocin do stimulate functional mammary tissues transmembrane sodium-iodide symporter expression (1, 4). Breast epithelial cells transmembrane sodium-iodide symporter mechanism was enhanced in this neonate secondary to transportation of the aforementioned maternal lactogenic hormones through the placenta (1). Subsequently, neonatal breast tissues displayed bilateral focal symmetrical tc-99m pertechnetate uptake on the thyroid scintigraphy. This is the only reasonable explanation for this unusual finding and many cases were reported in the literature previously with the same observation confirming this theory.

### CONCLUSION

Female neonate breasts tc-99m pertechnetate uptake is uncommonly seen scintigraphically and this is attributed to breast epithelial cells transmembrane sodium-iodide symporter mechanism enhancement, which resulted from transplacental maternal lactogenic hormones stimulation. This phenomenon should be kept in mind in order not to misinterpret this normal physiologically present imaging finding.

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**Citation:** Fahad Al-Lhedan, Anas Hamdoun. Female Neonate Breasts Tc-99m Pertechnetate Uptake. Archives of Radiology. 2020; 3(2): 06-07.

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