

삼상 골신티그래피상 자궁내장치의 광자감쇠현상에 의해 생긴 Uterine Doughnut: 인공물

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Uterine Doughnut by Intrauterine Device-induced Photon Attenuation on Three-Phase Bone Scintigraphy : Artifact

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A 44-year-old female underwent three-phase bone scintigraphy for an evaluation of right hip joint pain. The blood-flow and blood-pool images show a pelvic blush with a photopenic center (doughnut) prior to bladder filling. On the three hour delayed image, the pelvic uptake disappeared. The scintigraphic findings indicated the possibility of an early pregnancy. However, plain radiography demonstrated an intrauterine device. A uterine doughnut developed as a result of photon attenuation of intrauterine device. (Nucl Med Mol Imaging 2007;41(1):68-69)

Key Words: bone scintigraphy, uterine doughnut, uterine blush, intrauterine device, artifact

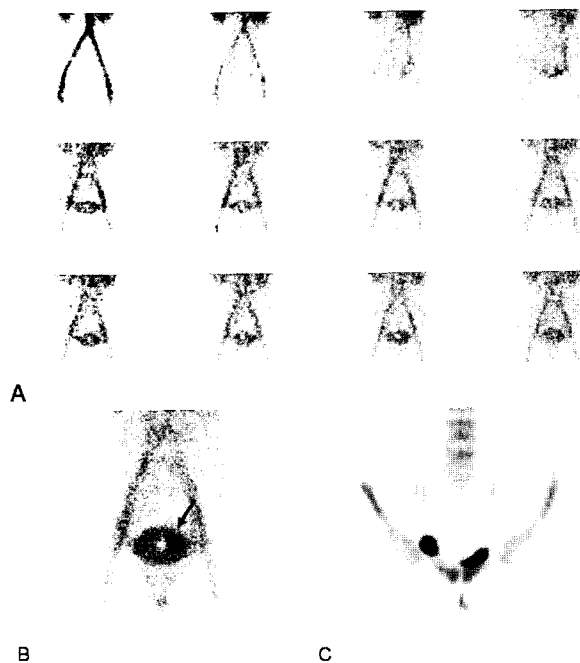


Fig 1. A 44-year-old female underwent three-phase bone scintigraphy for an evaluation of right hip joint pain. (A) Blood-flow and (B) blood-pool images show a uterine blush with a photopenic center (doughnut) before bladder filling (arrow). (C) The pelvic activity disappeared on the three hour delayed image. The question of an incidental pregnancy was raised. A physiologic uterine blush is a transient visualization of the uterus prior to bladder filling in the blood flow and blood pool phases of three-phase bone scintigraphy, which is known to occur during the menstrual cycle of female patients.¹⁾ The possible mechanisms are hyperemia during the secretory phase and necrosis and hemorrhage during the menstrual phase.^{1,2)} The uterine blush in the gravid uterus is caused by hormonally induced uterine muscular hyperplasia, hyperemia, and edema.^{3,4)} The pelvic doughnut sign on the multiphase bone scintigraphy has been reported in pregnant women. The embryo and amniotic sac represent a photopenic center and the more vascular uterus and placenta account for the surrounding hyperactivity.⁵⁾

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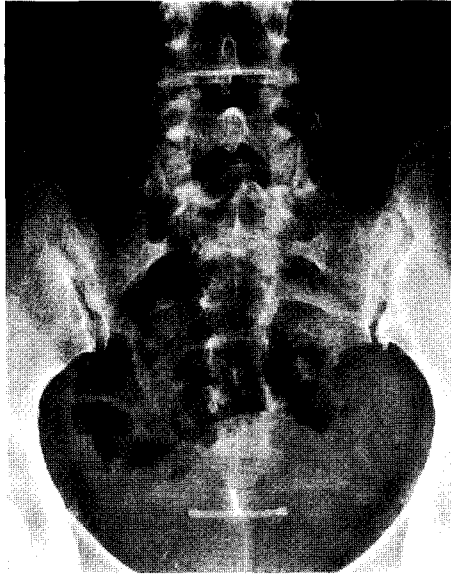


Fig 2. Plain radiography of the pelvis shows an intrauterine device (IUD) in the pelvic cavity. A gamma energy (140 Kev) of Tc-99m was attenuated as it passed through the tissue, with the loss of more than 50% of counts in 5 cm of soft tissue. The photon defects developed by photon attenuation were observed by external or internal objects.⁶⁾ Internal attenuating objects include permanent cardiac pacemakers, joint prostheses, breast or penile implants, food in the stomach, barium from previous gastrointestinal studies, etc. External attenuating objects commonly include rings, earrings, chains, coins, keys, buttons, belt buckles, etc. These artifacts may be easily recognized by their shapes and locations. However, if a photon defect is not usual in shape and location, it might be mistaken for a true lesion. In this case, the uterine doughnut was observed as a photon attenuation artifact developed by IUD.

References

1. Mandell GA, Harcke HT, Sharkey C, Brooks K. Uterine blush in multiphase bone imaging. *J Nucl Med* 1986;27:51-5.
2. Tzen KY, Yen TC. Uterine blush mimicking a hypervascular tumour in the pelvis as demonstrated by a triple-phase bone scan. *Nucl Med Commun* 1998;19:605-7.
3. Palestro CJ, Malat J, Collica CJ, Richman AH. Incidental diagnosis of pregnancy on bone and gallium scintigraphy. *J Nucl Med* 1986;27:370-2.
4. Lim ST, Sohn MH, Yim CY. Pregnancy-induced uterine blush detected incidentally by three-phase bone scintigraphy. *Clin Nucl Med* 2001;26:654.
5. Mandell GA, Harcke HT. Pelvic "doughnut". Sign of incidental pregnancy on bone scintigraphy. *Clin Nucl Med* 1987;12:116-7.
6. Howarth DM, Forstrom LA, O'Connor MK, Thomas PA, Cardew AP. Patient-related pitfalls and artifacts in nuclear medicine imaging. *Semin Nucl Med* 1996;26:295-307.