Alteration of the organ uptake of the 99mTc-MAA, induced by radiotherapy and chemotherapy

P Mohan, H Mahajan

Citation

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Abstract

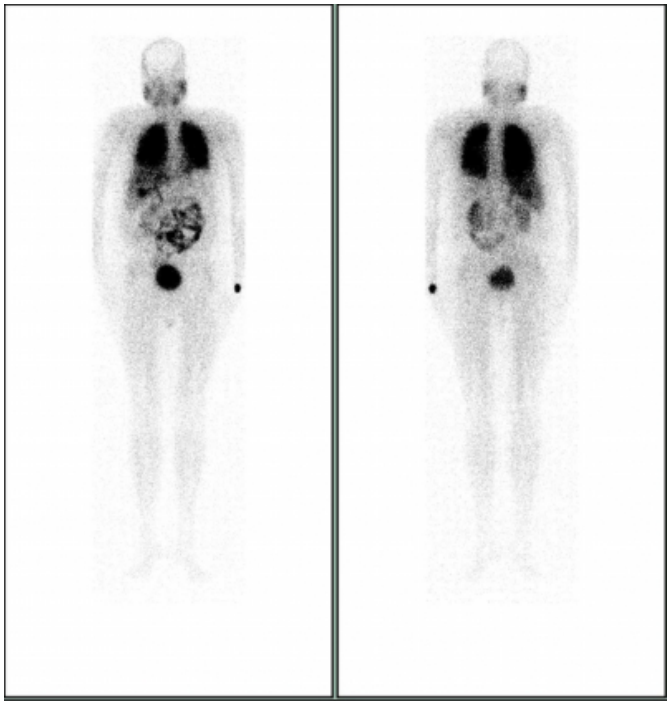
Several chemotherapeutic agents have been reported to alter the normal natural bio-distribution of radiotracers in the body, which may have certain implications in the interpretation of the results in the follow up of patients during and after chemotherapy. We present in this report an incidental detection of alteration of the organ uptake of the 99mTc-MAA, induced by radiotherapy and chemotherapy.

CASE REPORT

A 73-years-old man was referred to our department for a Ventilation-Perfusion scan due to suspicion of Pulmonary Embolism. His lung perfusion scintigraphy revealed an unusual picture. Besides visualization of the lungs, accumulation of Tc-99m macroaggregated albumin (MAA) was seen in salivary glands, liver, gall-bladder, intestines and urinary bladder. His medical history revealed that he was a known case of oesophageal carcinoma and had received 35 cycles of radiotherapy and 6 cycles of chemotherapy. His last cycle of chemotherapy was given 4 months back which included 5-FU and cisplatin. He had no evidence of intrapulmonary right to left shunt. In this case, we hypothesized that these adverse effect occurred because of the abnormally high delivery of the drugs to a particular normal tissue, resulting in exposure of the normal tissue to radiotherapy and an excessive dose of anticancer drugs and consequent injury. Because adverse effects were observed exclusively in the particular areas with intense ^{99m} Tc-MAA accumulation, tissue damage was considered to be produced by an radiotherapy and excessive concentration of the anticancer drugs.

Figure 1

Figure 1: Whole body anterior and posterior views showing abnormal uptake of Tc-99m MAA in the salivary glands, liver, gall-bladder, intestines, urinary bladder, besides lungs.



CORRESPONDENCE TO

Dr Parul Mohan, MBBS, DRM, DNB, Consultant, Department of Nuclear Medicine, Mahajan Imaging Centre, Fortis, Flt Lt. Rajan Dhall Hospital, B-1, Vasant Kunj, New Delhi-110070 E-Mail: drparulmohan@gmail.com

References

1. Jaffe N, Knapp J, Chuang VP, et al. Osteosarcoma: intra-

arterial treatment of the primary tumor with cis-diammine-dichloroplatinum II (CDP)-angiographic, pathologic, and pharmacologic studies. Cancer. 1983;51:402-407.
2. Eilber FR, Eckhardt J, Morton DL. Advances in the treatment of sarcomas of the extremity: current status of limb salvage. Cancer. 1984;54:2695-2701.
3. Kempf RA, Irwin LE, Menendez L, et al. Limb salvage surgery for bone and soft tissue sarcoma: a phase II pathologic study of preoperative intraarterial cisplatin. Cancer. 1991;68:738-743.
4. Petrilli AS, Gentil FC, Epelman S, et al. Increased survival, limb preservation, and prognostic factors for osteosarcoma. Cancer. 1991;68:733-737.
5. Tsuchiya H, Tomita K, Mori Y, et al. Caffeine-assisted chemotherapy and minimized tumor excision for nonmetastatic osteosarcoma. Anticancer Res. 1998;18:657-666.
6. Bacci G, Picci P, Ruggieri P, et al. Primary chemotherapy and delayed surgery (neoadjuvant chemotherapy) for osteosarcoma of the extremities: the Istituto Rizzoli Experience in 127 patients treated preoperatively with intravenous methotrexate (high versus moderate doses) and intraarterial cisplatin. Cancer. 1990;65:2539-2553.
7. Kashdan BJ, Sullivan KL, Lackman RD, et al. Extremity osteosarcomas: intraarterial chemotherapy and limb-sparing resection with 2-year follow-up. Radiology. 1990;177:95-99.
8. Shani J, Bertram J, Russell C, et al. Noninvasive monitoring of drug biodistribution and metabolism: studies with intraarterial Pt-195m-cisplatin in humans. Cancer Res. 1989;49:1877-1881.
9. Miller DL, Schneider PD, Gianola FJ, Willis M, Vermess M, Doppman JL. Assessment of perfusion patterns during hepatic artery infusion chemotherapy: EOE-13 CT and 99mTc-MAA scintigraphy. AJR. 1984;143:827-831.
10. Ziessman HA, Thrall JH, Yang PJ, et al. Hepatic arterial perfusion scintigraphy with Tc-99m-MAA: use of a totally implanted drug delivery system. Radiology. 1984;152:167-172.
11. Ziessman HA, Wahl RL, Juni JE, et al. The utility of SPECT for 99mTc-MAA hepatic arterial perfusion scintigraphy. AJR. 1985;145:747-751.
12. Tsuchiya H, Tomita K, Mori Y, Asada N, Yamamoto N. Marginal excision for osteosarcoma with caffeine assisted chemotherapy. Clin Orthop. 1999;358:27-35.
13. Tsuchiya H, Morinaga T, Taki J, Sumiya H, Matsui O, Tomita K. Effect of myocutaneous inflammatory changes caused by intra-arterial chemotherapy on the outcome of patients who undergo limb-saving surgery. Cancer. 2001;91:2447-2453.
14. Blacklock JB, Wright DC, Dedrick RL, et al. Drug streaming during intra-arterial chemotherapy. J Neurosurg. 1986;64:284-291.

Author Information

Parul Mohan, MBBS, DRM, DNB
Consultant, Department of Nuclear Medicine, Mahajan Imaging Centre, Fortis, Flt Lt. Rajan Dhall Hospital

Harsh Mahajan, MBBS, MD
Honorary Radiologist to the President of India