

FREQUENCY OF INTERSTITIAL RADIOTRACER INJECTION FOR PATIENTS UNDERGOING BONE SCAN

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DISCLOSURES

- None

BACKGROUND

- Tc-99m MDP
- Accumulates at areas of bony remodeling.
- Commonly used to detect bony metastasis, fractures, osteomyelitis, etc.
 - Detect subtle changes which can precede radiographic abnormality.

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99mTc MDP

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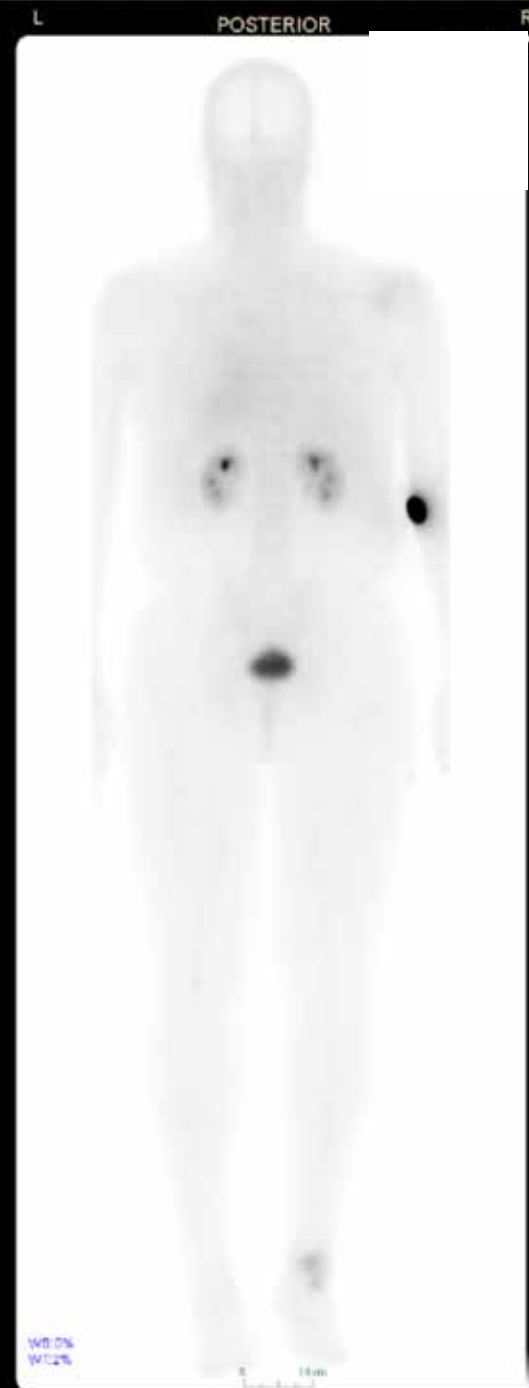


- Interstitial injections degrade study quality
 - Obscure adjacent structures
 - Less systemic bioavailability (↓ sensitivity)
 - Image scaling errors



Total Counts 862.27

Max. count 32.812



Total Counts 672.19

Max. count 19.90

- Interstitial injection rates were subjectively deemed to have increased over recent years, so a clinical audit was undertaken.
- No previous audit for comparison. No known standardized target.
- Arbitrary target of 10% interstitial injection rate.
 - Perfect 0% unrealistic.

METHODS

- Retrospectively reviewed 25 consecutive whole body bone scans from each Edmonton nuclear medicine site, retrieved through PACS.
- 3 hospital sites.
- 6 clinic sites.
- 225 total studies.

METHODS

- Parameters recorded:
 - Study indication
 - Patient age
 - Site of injection
 - Injecting technologist
 - Presence/absence of interstitial injection
 - Study limitation/concerns by the interpreting radiologist due to interstitial.



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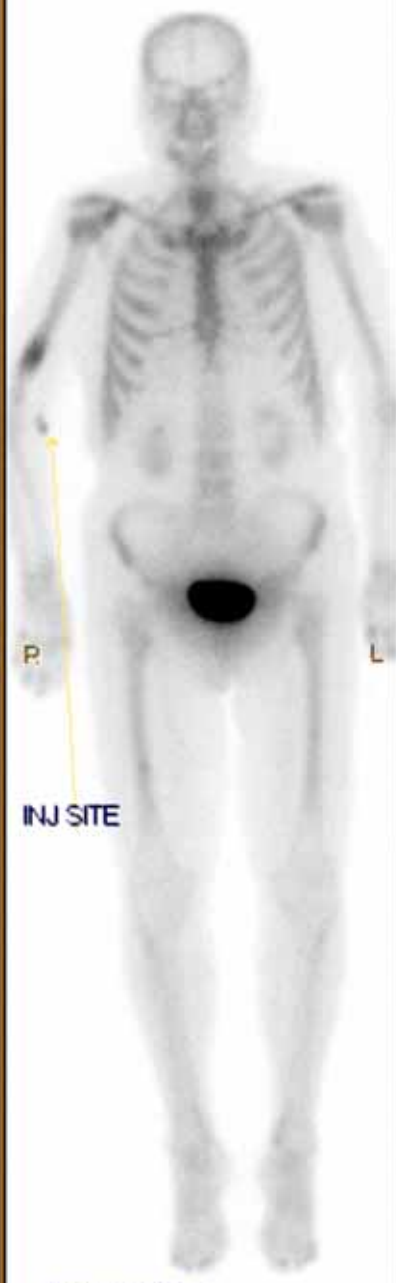
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INJ SITE

99mTC-MDP



Site	Interstitial rate (<10% target)	
Hospital 1	4/25	(16%)
Hospital 2	7/25	(28%)
Hospital 3	6/25	(24%)
Hospital total	17/75	(23%)

- 3/3 hospital sites and 2/6 clinic sites failed to meet target.
- Inconsistent documentation between sites limiting interpretation of contributory factors.
 - Higher volume centers had higher interstitial rates.
 - Interstitial rates lower in pediatric population.

INTERVENTION

- Findings presented at a city-wide nuclear medicine technologist in service.
 - Inquired as to additional contributing factors and site-specific issues.
 - Inpatient vs outpatient
 - Indwelling IV
 - Time of day

INTERVENTION

- No significant difference between sites and no identified modifiable factors.
- Stressed the importance of adequate injections
- Informed departments that there will be a repeat audit
- Requested consistent documentation on the tech worksheets across the sites

RE-AUDIT

- Performed two months following intervention.
- Documentation improved across sites.

Site	Pre-intervention		Post-intervention	
Hospital 1	4/25	(16%)	2/25	(8%)
Hospital 2	7/25	(28%)	11/25	(44%)
Hospital 3	6/25	(24%)	10/25	(40%)
Hospital total	17/75	(23%)	23/75	(31%)
Clinic 1	1/25	(4%)	3/25	(12%)
Clinic 2	0/25	(0%)	3/25	(12%)
Clinic 3	4/25	(16%)	4/25	(16%)
Clinic 4	7/25	(28%)	7/25	(28%)
Clinic 5	2/25	(8%)	4/25	(16%)
Clinic 6	2/25	(8%)	2/25	(8%)
Clinic total	16/150	(11%)	23/150	(15%)
Total	33/225	(15%)	46/225	(20%)



CONCLUSION

- Failed intervention.
- 2/3 hospital and 5/6 clinic sites failed to meet target post-intervention.
- Site volume and patient age remain as the only contributory factors.

- Additional time and cost-effective modifiable factors?
- No non-diagnostic or limited interpretation due to interstitial injection in the 450 studies.
 - Is this truly a problem?

REFERENCES

- Radiographics 2003; Love C, et al. Radionuclide bone imaging: an illustrative review. 23: 341-358
- Technetium-MDP Chemistry and Pharmacology. Retrieved March 22, 2016, from <http://www.auntminnie.com>
- STATdx | Nuclear Medicine: Metastatic Bone Tumors. Retrieved March 22, 2016, from <https://my.statdx.com>
- Weinstein S. Plumer's Principles and Practice of Intravenous Therapy, 7th edition. Philadelphia, Pa., Lippincott Williams and Wilkins, 2001.