

# Bone Scan in Nasopharyngeal Carcinoma in a Malaysian Hospital

T Sing

## Citation

T Sing. *Bone Scan in Nasopharyngeal Carcinoma in a Malaysian Hospital*. The Internet Journal of Otorhinolaryngology. 2005 Volume 4 Number 2.

## Abstract

In Sarawak Malaysia, nasopharyngeal carcinoma is a very common male malignancy often presenting in advanced stages with distal metastasis. The great majority of these NPC patients are treated by radiotherapy in Sarawak General Hospital. Bone scans using  $^{99m}\text{Tc}$  were done on 41 of these patients over the period of nine months from July 2003 to March 2004. A Very low true positive rate of 9.8 % and relatively high false positive rate of 44% were found and this is mainly due to large numbers of benign diseases such as degenerative spines. The radiologists' correct report rate in true positive bone scans is 75% but their high uncertain report rates of 72% in false positive bone scans are also high, probably suggesting their caution in patients with benign diseases showing positive bone scans. Positive bone scans were found in 51.7 % (15/29) of the newly diagnosed patients, and 58 % (7/12) of the treated patients, suggesting that bone scans are sensitive for screening so as to help target the sites for XR imaging for confirmation of presence of metastasis. Based on 18 cases of false positive scans and 2 cases of true negative scans the specificity of bone scans in NPC is 10% which is low. As there were no cases of false negative scans found, the sensitivity of the bone scan could not be calculated. Moreover, this series compares well with the past reported series in terms of the positive and true positive bone scan rates.

## INTRODUCTION

Nasopharyngeal carcinoma (NPC) tops the list of malignancy in Malaysia<sup>1</sup>. It ranks first in male malignancy in the State of Sarawak<sup>2,3</sup>. The majority of the NPC presented late in their advanced stages and often with distal metastasis, usually to the bones<sup>2,3</sup>. The great majority of these NPC patients are treated by radiotherapy in Sarawak General Hospital.

In 2003, a new practice of bone scan using  $^{99m}\text{Tc}$  started in Sarawak General Hospital and over the period of nine months from July 2003 to March 2004, 41 NPC patients had the bone scans and our experience in these is presented

## METHOD

The NPC patients were selected consecutively including both new and treated patients. The scanner used was Siemen Ecam plus and Technecium ( $^{99m}\text{Tc}$ ) the radio-active isotope used. The scan images were read and reported by qualified and trained Radiologists. The bone scans were requested by Specialists from the ENT department of the Hospital. The bone scan reports were checked by the ENT Specialists and the decisions made as to clinical correlation and any further definitive imaging studies. NPC stages were I, II, III, and IV,

and early stages included I + II whereas advanced stages III + IV. True positive bone scan was when bone scan and XR imaging both positive; False positive bone scan when bone scan positive but XR imaging negative. True negative bone scan was when both bone scan and XR imaging negative whereas false negative bone scan was when bone scan negative but XR imaging positive.

## RESULTS

41 NPC patients were included in the studies. The ages of the patients range from 18 to 88 years, with a mean age being 50.5. There were 29 newly diagnosed, 12 treated (old follow-up) patients. All 41 patients had bone scans & 22 of them had positive bone scans. These 22 patients had XR imaging subsequently and 10 of them had degenerative spine diseases.

4 of these 22 patients (9.8% of total 41 patients) had true positive bone scans, 1 in newly diagnosed early stages and 3 in treated patients all in advanced stages of NPC. 18 of these 21 patients (44% of total 41 patients) had false positive bone scans, 14 in newly diagnosed, 1 in early stages and 13 advanced stages, and 4 in treated patients all in advanced stages of NPC.

2 of the total 41 patients (4.9%) had true negative bone scans, both were treated patients in advanced stages of NPC. There were no patients with false negative bone scans in this series.

Distal bone pain was present in 6 of the 41 patients. Of these, 2 treated patients in advanced stages of the disease had positive bone scans, 2 had false positive bone scans, 1 in a newly diagnosed patient in early stage and 1 treated one in advanced stage of the disease. The other 2 were treated ones in advanced stages and had true negative bone scans.

Radiologist reports were correct in 75% of true positive bone scans (3 out of 4), and in 17% of the false negative bone scans (3 out of 18). Radiologists' reports were uncertain in 25% (1 out of 4) of the true positive bone scans and in 72% (13 out of 18) of the false negative bone scans.

In 2 of the 18 (11%) false negative bone scan patients, the radiologist reports were incorrect.

**DISCUSSION**

The true positive rate of 9.8 % (4/41) is very low. The false positive rate of 44% is relatively high, and this is mainly due to large number of benign diseases (majority being degenerative spine diseases, 10 patients).

Although positive bone scans were found in 51.7 % (15/29) of the newly diagnosed patients, and 58 % (7/12) of the treated patients, true positive bone scans were found only in 3.6 %(1/29) and 25% (3/12) respectively. These findings seem to indicate that bone scans are sensitive for screening so as to help target the sites for XR imaging for confirmation if metastasis is present.

There were 18 cases with false positive scans and 2 cases with true negative scans in this series. This makes the specificity of bone scans in NPC to be 10%. As there were no cases of false negative scans, the sensitivity of the bone scan could not be calculated.

The radiologists' correct report rate of 75%(3/4) in true positive bone scans is high. Their high uncertain report rates of 72% (13/18) in false positive bone scans seem to suggest their caution in patients with benign diseases such as degenerative spines. These benign diseases also gave positive bone scans.

Table 1 shows the comparison of the positive and true positive bone scan rates in this series with the reported series over the search period of past 15 years.

**Figure 1**

Authors	Leung 19914	Sham 19915	Sundram 1990 6	Kraiphikul 19917	Zen 19918	Tiong 2004	
Number patients NPC	163 new	132 new	143 new 162 treated	112 new	23 treated	29 new 12 treated	
Positive bone scan new patients	18 %	33 %	23 %			51.7 % (15/29)	
Positive bone scan treated patients			50 %			58 % (7/12)	
True Positive bone scan new patients	1.8 %	3.8 %		2.7 %		3.6 % (1/29)	
True Positive bone scan treated patients					22 %	25% (3/12)	

**SUMMARY**

In this series, although false positive rate of bone scans is high due to relatively large number of benign diseases, the high rate of positive bone scans suggest that bone scans are sensitive for screening so as to help target the sites for XR imaging for confirmation if metastasis is present. As there were no cases of false negative scans, the sensitivity of the bone scan could not be calculated. Moreover, this series compare well with the past reported series in terms of the positive and true positive bone scan rates.

**CORRESPONDENCE TO**

Dr Tiong T Sing Faculty Medicine & Health Sciences, UNIMAS Lot 77 Jalan Tun Zaidi Adruce 93150 Kuching Sarawak Malaysia Email address: ytiong27@yahoo.co.uk Telephone number: +60 82 416 550 Fax number: +60 82 422 564

**References**

1. Prasad U, Rampal L Descriptive epidemiology of nasopharyngeal carcinoma in Pennisular Malaysia . Cancer Causes and Control, 1992; 3:179-82
2. Lim GCC. Overview of Cancer in Malaysia Jpn J Lin Oncology, 2002; 32 (Supp)S37-S42))
3. Devi BC, Pisani P, Tang TS, Parkin DM. High incidence of nasopharyngeal carcinoma in native people of Sarawak, Borneo Island. Cancer Epidemiol Biomarkers Prev 2004 Mar;13(3):482-6.
4. Leung SF, Stewart IE, Tsao SY, Metreweli C. Staging bone scintigraphy in nasopharyngeal carcinoma, Clin Radiol (England)1991 May;43(5):314-5
5. Sham JS, Tong CM, Choy D, Yeung DW. Role of bone scanning in detection of subclinical bone metastasis in

- nasopharyngeal carcinoma. Clin Nucl Med 1991 Jan ; 16(1) : 27-9
6. Sundram FX, Chua ET, Goh AS, Toh HJ, Khor TH., Chua EJ. Bone scintigraphy in nasopharyngeal carcinoma. Clin Radiol (England)1990 Sep : 42 (3) : 166-9
7. Kraiphibul P, Atichartakarn V, Clongsusuek P, Kulapaditharom B, Ratanatharathorn V, Chokewattanaskul P. Nasopharyngeal carcinoma: value of bone and liver scintigraphy in the pre-treatment and follow-up period. J med Assoc Thai 1991 Jul ; 74 (7) : 276-9
8. Zen HG, Jame JM, Chang AY, Li WY, Law CK, Chen KY, Lin CZ. Nasopharyngeal carcinoma with bone marrow metastasis Am J Clin Oncol 1991 Feb : 14 (1) : 66-70

**Author Information**

**Tiong T. Sing, MBBS (Melb), BMedSc (Melb), FRACS**

Associate Professor, Department of Surgery, Faculty Medicine & Health Sciences, University Malaysia Sarawak