SECTION 20. Medicine.

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ROLE OF CT SCAN IN DIAGNOSIS OF METASTATIC CERVICAL LYMPHADENOPATHY

Abstract: Objective: Its objective is to diagnose cervical metastatic lymphadenopathy using helical CT scan in comparison with histopathological findings.

Design: It is a comparative type of cross sectional study

Patients and Method: Place of study was Radiological ward of Bahawal Victoria Hospital Bahawalpur,Pakistan. Duration of study was October 2016 to September 2017. Study was completed in 12 months. This study involves 60 patients which were undergone Helical CT scan examination of cervical lymph nodes after giving an intravenous contrast medium. Signs of cervical lymph nodes metastasis were observed such as Shape, structure ring enhancement and size of nodes. These findings were compared with results of histopathological examination.

Results: This study was done on 60 cases with age from 25 to 70 years. Among 60 cases 56 were diagnosed for metastatic lymphadenopathy on the bases of findings on CT scan. Three cases were false positive and one case was diagnosed as false negative on CT scan examination.

Conclusion: Ct scan with Iv contrast is very helpful in making diagnosis and management of cervical lymphadenopathy in patients with metastatic disease.

Key words: CT scan, cervical lyphadenopathy, metastatic disease

Language: English

Citation: Hayat S, Javed S, Hameed M (2018) ROLE OF CT SCAN IN DIAGNOSIS OF METASTATIC CERVICAL LYMPHADENOPATHY. ISJ Theoretical & Applied Science, 03 (59): 244-248.

Soi: http://s-o-i.org/1.1/TAS-03-59-42   Doi: crossref https://dx.doi.org/10.15863/TAS.2018.03.59.42

INTRODUCTION

Patients with cancer of cervical area or head region are most prone to local metastasis of disease which is a significant factor of prognosis. Mostly tumors metastasize via lymphatic system so lymph nodes should be treated on priority bases in all those patients in which have cancer of head or neck. Lymph nodes involvement is a bad prognostic factor. Clinically it is necessary to evaluate the patient for cervical lymadenopathy of metastatic nature.[1] Prior to perform surgery for neoplastic disease, it is important to find out metastasis of cervical lymph nodes using helical ct scan with iv contrast. In 1998 much advancement was made in the technique of CT scan which can do quick scan of large area of soft tissue. Helical CT scan can detect metastasis of Lymph nodes in oblique and an arbitrary plane which is a special feature of this technique.[2] Duration of one year was spent to complete this study which is a prospective type of study with the purpose of

detection of cervical lymph nodes metastasis. Its results were also compared with histopathological examination. Diagnosis was made on the bases of primary criterion given in the table-2. All data obtained from CT scan such as size, shape and structure of lymph nodes. Histopathological findings were also recorded. A proper written consent was taken from the Medical superintendant of the hospital to conduct the study and from the patients as well. Data was composed on Microsoft office version 2007.

Patients and Methods

Sixty patients were included in this cross sectional and comparative type of study. Some these patients were admitted via out-patient doors and some were directly referred to radiological department for CT scan and to pathological department for histopathology. Duration of study was from October 2016 to September 2017. Among these

60 cases 40 were males and 20 were females. Their age range was from 25-70 years with mean age of 43 years. Before doing CT scan thorough examination of the patient done, especially cervical examination for any mass or any finding. During scan patient was in supine position. Slices of cervical CT scan were 3-5 mm. An intra venous contrast was injected before scan. Volume of injecting contrast was given according to weight of the patient and evaluating for its any contraindication. Collimation was 5mm and pitch was 0.8. The contrast medium used intravenously was iopamidol. Scan was done after 40-45 seconds of giving contrast. This allows the contrast medium to spread into the tissues. Evaluation of CT scan was done by senior expert radiologists. Films of scan were studied according to the features of cervical lymphadenopathy and basic criteria of making diagnosis as given in the table-1. Biopsy for histopathology was taken via excision taking maximum tissue of nodes. Total number lymph nodes either malignant or benign and necrotic nodes were recorded for all patients individually. Size of nodes was also recorded. For study purpose nodes were classified into sub-mental nodes, sub-mandibular, Jugular, Posterior cervical and supra clavicular lymph nodes. Jugular nodes were further divided into sub categories. These groups of nodes give information about extension of disease related to their areas. Result of CT scan and histopathology were compared but diagnosis was confirmed by histological examination. Result was noted in categories of true positive-negative and false positive-negative.

RESULTS

This study was done on 60 cases. Among them 56 (93.3%) cases were Correct diagnosed via helical CT scan while 4 (6.6%) cases were misdiagnosed. Among 56 cases 46 (82%) cases were true positive and rest 10(17.8%) were found true negative. Out of these 4 cases which were misdiagnosed 3 were false positive and one case was false negative. Size of nodes is very important in making diagnosis. Size can be calculated by markings on CT scan film. Among 46 true positive cases 44(95.6%) had large size nodes while 2(4.3%) had normal size nodes and they were evaluated on other criteria of malignancy. While in 10 true negative cases 8(90%) cases had normal size nodes. Necrosis of lymph nodes is also an important sign of metastasis. In 46 true positive cases 38(82.6%) had necrosis of nodes. Another important criterion is ring enhancement of nodes on scan after intravenous contrast which was found in 33(71.7%) cases out of 46 positive cases. Palpable cervical mass is also an important feature of malignancy which was found in 30(65.2%) out of 46 cases. Among these 30 cases having neck mass, 25(83.3%) were having squamous cell carcinoma of nasal and oral cavity while 5(16.6%) had lymphoma. In remaining 16 positive cases 9(56.2%) were having mass in the abdomen. Shape of lymph nodes is another feature to diagnose metastasis. In 46 true positive cases 32(69.5%) had Round shape nodes. In 21(45.6%) cases metaplasia of adipose tissue was found. Among 60 cases lymphadenopathy was excluded in 10 cases so specificity is 83% and accuracy is 90 for diagnosing metastatic adenopathy.

Table-1

Criteria of diagnosis of malignant cervical lymphadenopathy

Points of basic criteria	Other features
Lymph nodes with abnormal size	Source of malignancy in neck or head
Necrosis of nodes and distorted internal structure	Shape is abnormal
Ring enhancement after iv contrast	Metaplasia of fat tissue of nodes

Discussion

CT scan imaging for cervical metastatic lymphadenopathy helps to diagnose the disease, staging the malignancy, to plan treatment and to determine prognosis of the disease after chemo or radiotherapy. It is also useful in follow up of patients having malignancy. Metastatic adenopathy of neck is a bad prognostic factor of head and neck tumors. It is risk factor of recurrence of tumor and metastasis to other parts of body.[1-3] Those cases were included, which were having palpable neck mass sent to

radiology department from In-doors and out-Patient doors for helical CT scan imaging. Histopathological examination of nodes was compared with imaging findings. Lymph nodes of various sizes were recorded. Fifty six cases out of 60 were having enlarged lymph nodes. Sensitivity was 95.6%, Specificity of CT scan was 83% and accuracy was 93.3% according to this study. A study done by Micheal et al, axial diameter of nodes was used to diagnose metastatic lymphadenopathy. In their result minimum diameter was 10-12mm.[4]They used lymph

node necrosis as diagnostic criteria of nodal metastasis as it is most common in tumors of neck and head. [5-7] According to our study 38 cases out of 46 positive cases were having necrosis of nodes. But it could not be found in 8 cases. A study done by King et al.[8] Central necrosis of lymph nodes was used as a diagnostic criterion for metastatic adenopathy and MRI, Ultrasonography and Computed tomography were used to assess lymph nodes. They studied 89 lymph nodes for necrosis. Sensitivity of their study was 92%, specificity was 91% and accuracy was 93%. Micheal et al studied lymph nodes for necrosis.[4] According to his study specificity was 100%. CT scan with iv contrast is an ideal investigation. When necrotic area of nodes is larger than 3mm then sensitivity was 74% and specificity was 94%. According to our study in 46 true positive cases 33 were having ring enhancement. As in Michael et al study ring enhancement was main criteria with specificity of 100%. In our study 10 cases were true negative and among them 7 cases showed calcification of nodes. On CT scan features of ring enhancement and central necrosis point towards tuberculosis of lymph nodes and in these cases tuberculin skin test is positive.[9-11] Walls of tuberculous nodes are thicker than walls of metastatic nodes on contrast.[12] Sign of calcification is also another finding in T.B of lymph nodes.[13] Among 46 true positive cases 30(65.2%) had palpable cervical mass. In these 30 cases 25 had squamous cell carcinoma and 5(16.6%) cases had lymphoma. In other 16 cases 9 had intra abdominal tumor as a primary source of malignancy. If we are unable to find primary source of malignancy then we may trace source following route of lymphatic drainage as in malignancies of neck and head regions.[14,15](Table-2) Among 46 positive cases 32(69.6%) had round shape nodes as compared to normal bean shaped nodes with adipose tissue in the hilum.[16] In 21(45.6%) cases involvement of fat tissue of hilum of nodes was found.

Table-2

Source of metastasis of lymph nodes

Level 1	Sub-mandibular gland , oral cavity
Level 2	Oropharynx, nasopharynx, parotid, supraglotic part of larynx
Level 3	Oropharynx, hypopharynx, supraglotic part of larynx
Level 4	Subglotic part of larynx,hypopharynx, esophagus, thyroid
Level 5	Nasopharynx, oropharynx
Level 6, 7	Thyroid, larynx and lungs
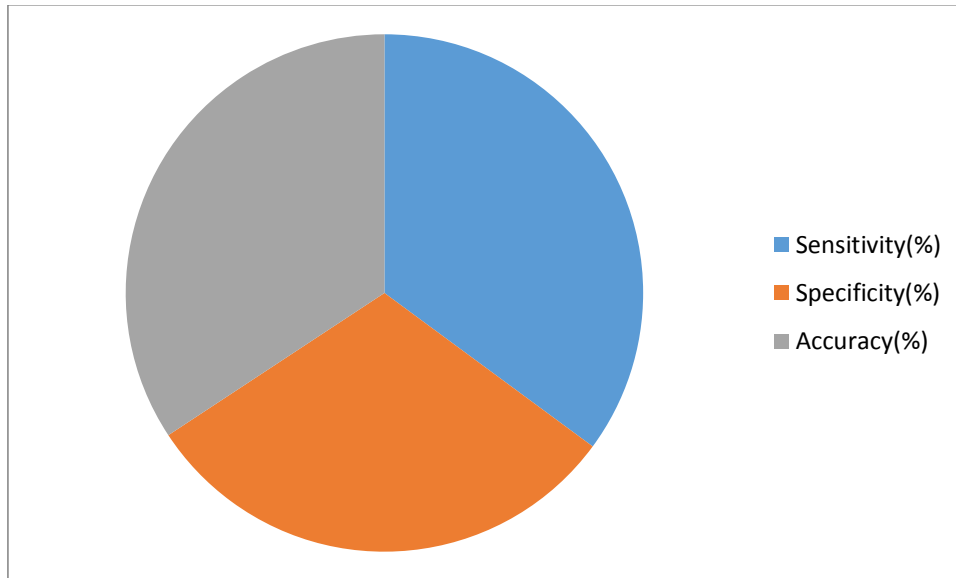
Picture 1 - A Pie chart showing sensitivity, specificity and accuracy of helical CT scan.

CONCLUSION

Helical CT scan is very useful to diagnose metastatic cervical lymphadenopathy. The diagnostic criteria for metastasis include enlarged size nodes (more than 10mm diameter), Irregular shape enhancement on CT scan and central necrosis of lymph nodes (greater than 3mm). This scanning technique is very useful in diagnosisng disease early sothat treatment may be started soon.

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