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THE ROLE OF MRI IN THE ILLUSTRATION OF METASTATIC LYMPHATIC PATHWAYS AND CLINICAL N-STAGING OF NASOPHARYNGEAL CARCINOMA

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Subject: To study the role of MRI in the illustration of metastatic lymphatic pathways and clinical N-staging of nasopharyngeal carcinoma (NPC). Methods: Eighty NPC patients were examined with MRI before radiotherapy from Mar. 1994 to Jun. 1996. MRI were performed using T_1 weighted image (T_1WI) and T_2 weighted image (T_2WI) in transverse, and using T_1WI in sagittal and coronal sections. Results: 1. NPC chief metastatic lymphatic pathways are: primary foci → Rouviere's node (RN), or retrostyloid space nodes (RSN) secondarily → deep cervical nodes; 2. The superior border of neck fields should be moved upward to the level of external acoustic meatus; 3. The authors suggested that in N-staging for NPC, N_0 and N_1 be divided into N_0a and N_0b, and N_1a and N_1b. Conclusion: MRI is very useful in clinical N-staging of NPC, especially for the reflection of the influance of RN and/or RSN tumefaction on N-staging.

Key words: Nasopharyngeal carcinoma, N-staging MRI.

Magnetic Resonance Imaging (MRI) has become an important method for the observation and diagnosis of nasopharyngeal carcinoma (NPC). For the normal and abnormal nasopharyngeal anatomical structures, it shows more distinctly and comprehensively. The purports of this paper is to study the role of MRI in the illustration of metastatic lymphatic pathways and clinical N-staging of NPC.

MATERIALS AND METHODS

Patients

Eighty initial (none received prior therapy) NPC patients, who all had histopathological confirmation of the disease, were examined with MRI before radiotherapy from March 1994 to June 1996. There were 57 male, and 23 female. The average age was 47.0 years (ranged 29–69 years). The histopathological types were: 68 poorly differentiated squamous cell carcinomas, 6 vesicular nucleus cell carcinomas, 2 adenoid cystic carcinomas, 2 spindle cell carcinomas, and 2 undifferentiated carcinomas.

Image Examination

MRI was performed using T_1 weighted image (T_1WI) and T_2 weighted image (T_2WI) in transverse, and using T_1WI in sagittal and coronal sections with a 0.5 Tesla GE-Vectra superconduction MR clinical unit. A layered thickness was 5 mm, layered distance was 1.0 mm, and layered numbers were: transverse in 18, sagittal and coronal each 9, respectively.

RESULTS

The Relationship Among Lymph Nodes Examined by MRI

Table 1 presents the relationship among Rouviere's nodes (RN), retrostyloid space nodes (RSN), and deep cervical nodes (DCN) tumefaction (two sides in each case is considered 2).

The RN, RSN and DCN Tumefaction on MRI

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The diagnostic standard of RN abnormality is according to the Mancuso standard,[1] and its largest diameter exceeded 1.0 cm. The detectable rate of RN tumefaction was 35.0% (56/160), and it was less than that which Wei reported.[2] On MR images, RN tumefactions were located between prevertebral muscle and homolateral retrostyloid space.They were intermediate signal intensity on T_1WI, high signal intensity on T_2WI, and shrink after radiotherapy. It is very difficult to distinguish them if they were confluent with RSN tumefaction. For the RN tumefacient patients, their nasopharyngeal (NP) primary tumor were located on the superioposterior and/or homolateral wall. If NP primary tumors are located on the NP roof and/or posterior wall, there may be bilateral RN tumefactions. It is suggested that they may be in correspondence with NP lymphatic drainage.

The detectable rate of RSN was 26.3% (42/160). Only RN and/or RSN tumefaction, but no positive neck node, the rate was 12.5% (20/160).

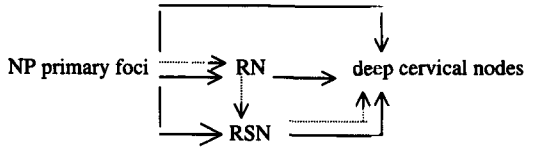
Table 1. The frequencies of RN, RSN and DCN tumefaction in the present series

RN	RSN	DCN	Frequencies	%
−	−	−	40	25.0
−	−	+	36	22.5
+	−	+	29	18.1
−	+	+	23	14.4
+	−	−	13	8.1
+	+	+	12	7.5
−	+	−	5	3.1
+	+	−	2	1.3

DISCUSSION

NPC Metastatic Lymphatic Pathways

According to the relationship of the RN, RSN and DCN, it prompted that NPC metastatic lymphatic pathways are illustrated as following:



Notes: ——— Primary lymphatic pathway
····· Secondary lymphatic pathway

The first echelon of metastatic lymph node in NPC is RN and/or RSN. The facial-cervical field is superior for the compass of NP primary tumor and the first echelon of metastatic lymph nodes, and it is recommended be used. DCN of NPC are divided into three groups,[3] RN and a small group of DSN which lying near the base of the skull in the retroparotid space are all above the level of the tip of mastoid process. The superior border of conventional neck fields are located at the level of the tip of mastoid process, and the lymph nodes mentioned above are suspected to be omitted. These results support Guan's[4] opinion that the superior border of neck fields should be moved upward to the level of external acoustic meatus.

NPC Clinical N-staging

The authors suggested that in N-staging for NPC, N0 and N1 be divided into N0a and N0b, and N1a and N1b. N0a: Neither RN and RSN tumefaction on image (CT or MRI), nor clinically palpable node. N0b: No clinically palpable node, but without image study. N1a: RN and/or RSN tumefaction on image, but no clinically palpable node. N1b: Movable node at the upper cervical area, and its size is less than 3 cm. MRI is very useful in clinical N-staging of NPC, especially for the reflection of the influence of RN and/or RSN tumefaction on N-staging.

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