Cervical Tuberculous Lymphadenitis: MR Features

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Purpose: To characterize the magnetic resonance (MR) imaging features of cervical tuberculous lymphadenitis.

Materials and Methods: The cervical MR images of 14 patients with pathologically or clinically proven cervical tuberculous lymphadenitis were retrospectively analyzed. T1- and T2-weighted or proton density images and contrast enhanced MR images were obtained in all patients.

Results: Most patients had multiple (n=12), unilateral lesions (n=10), 8 mm to 45 mm in size, round (n=46) or ovoid (n=46) in shape and all with smooth and well-defined margins mostly at internal jugular chain (N2: 41, N3: 2, N4: 21). The signal intensities of the most lymph nodes were isointense or slightly hypointense on T1-weighted images, and hyperintense (all) with variable homogeneity on T2-weighted and/or proton density images. After contrast enhancement most showed characteristic thin peripheral rim enhancement (n=71).

Conclusion: The characteristic MR features of cervical tuberculous lymphadenitis would be multiple, unilateral enlarged lymph nodes which show iso or slightly increased signal intensity on T1-weighted image, high signal intensity on T2-weighted and/or proton density image and peripheral rim enhancement.

Index Words: Lymphatic system, infection
Lymphatic system, MR
Tuberculosis

In recent years, although the prevalence of the tuberculosis is declining, the importance of diagnosis of the tuberculosis is increasing as the incidence of the tuberculosis related the immune-compromising status such as acquired immune deficiency syndrome is increased. As a common extrapulmonary manifestation of pulmonary tuberculosis, cervical tuberculous lymphadenitis requires the differentiation from the other cervical masses such as the lymphoma, the metastatic lymphadenopathy and the reactive lymph node hyperplasia. The computed tomographic (CT) findings of cervical tuberculous lymphadenitis have been well documented. According to our knowledge, however, there have been no descriptions concerning the magnetic resonance (MR) imaging features of cervical tuberculous lymphadenitis. The purpose of this article is to describe the MR features of cervical tuberculous lymphadenitis.

MATERIALS and METHODS

The cervical MR images of 14 consecutive patients (eleven women, three men; age range, 15–55 years) with two cases of follow-up MR images were retrospectively reviewed. The diagnoses were established by aspiration biopsy in seven and excisional biopsy in five patients and by clinical follow-up after anti-tuberculous medications in two patients (Table 1).

MR imaging was performed with 1.5T superconducting MR unit (Siemens, Erlangen, Germany), using spin-echo pulse sequences. Before contrast administration, T1-weighted (500–800/15 repetition time/echo time msec) axial and coronal images and T2-weighted and/or proton density (2100–2500/20–80 msec) axial and/or coronal images were obtained. After intravenous injection of gadopentetate dimeglumine (0.07–0.1 mmol/Kg body weight, Magnevist®, Schering, Berlin, Germany), T1-weighted axial, coronal and sometimes sagittal images were obtained.
in all patients. Fat suppression technique via inversion recovery was applied for more clear demonstration of high signal intensity of the lesion on T2-weighted or gadolinium-enhanced T1-weighted images. The slice thickness was 4 mm. The matrix number was 192–256 × 256, and the number of acquisition was two.

The MR images were analyzed regarding the multiplicity, location, size, shape, margin, signal intensity and enhancement pattern of the lymph nodes.

The locations of lymph node followed the classification by Som (1).

The enhancement was defined as either homogeneous or peripheral in pattern. The peripheral pattern was subdivided as thin (less than 4 mm) and thick rim (equal or more than 4 mm) enhancements (2).

RESULTS

Ninety seven lymph nodes were observed in 14 patients.

Most patients (n=12) had multiple nodes 2 to 24 in number while two patients had single nodal involvement. In multiple lesions, unilateral lymphadenitis was dominant (n=8) than bilateral (n=4) (Table 1).

The visible nodes were 8 mm to 45 mm in size. Most of the nodes were internal jugular group in location (N2: 41, N3: 2, N4: 21) and the others were posterior triangle (N5: 22), submandibular and submental nodes (N1: 7), and mediastinal nodes (n=4).

The lymph nodes were round (n=46), ovoid (n=46), or lobulated (n=5) in shape and showed the tendency of lobulation as the size increased.

All nodes showed smooth and well-defined margin. The signal intensity of the lymph nodes were either homogeneously isointense or slightly hyperintense (n=84) than those of cervical muscles and some showed peripherally hyperintense ring-like pattern (n=13) on T1-weighted images. On T2-weighted or proton density images, the signal intensity of lymph nodes were hyperintense either homogeneously (n=36) or inhomogeneously (n=25) (Fig. 1, 2).

On gadolinium-enhanced T1-weighted images, peripheral thin rim enhancement pattern was dominant (n=71) (Fig. 1) than peripheral thick enhancement (n=14) (Fig. 2) or homogeneous enhancement (n=12).

The follow-up MR images in two patients showed constant characteristics of the affected lymph nodes except for the decrease in size (Fig. 3) or increase in enhancing portion of granulation tissue

DISCUSSION

The CT features of cervical tuberculous lymphaden-
Cervical Tuberculous Lymphadenitis

It is well documented as multiple, bilateral, low-density, posterior triangular nodal enlargement with thick and irregular rim enhancement (3, 4), while the MR features of which have not been described. Furthermore, the MR criteria of the pathologic nodes are only based on that the increase of the signal intensity on long TR image and of the enhancement after contrast injection. Which was the reason that we included

![Fig. 1](image1.png)

Fig. 1. a. T1-weighted image shows a lymph node (arrow) which shows homogeneously and slightly hyperintense signal intensity than that of cervical muscle. And another small node shows the same MR features.
b. On proton density image, the nodes show homogeneously hyperintense signal intensity (arrow).
c. Peripheral thin enhancement pattern is noted on contrast enhanced T1-weighted image (arrow) which is the most common MR feature of tuberculous cervical lymphadenitis.

![Fig. 2](image2.png)

Fig. 2. a. T1-weighted image shows a lymph node (arrow) which shows peripheral hyperintense ring-like pattern.
b. On fat suppression image, the node shows homogeneously hyperintense signal intensity (arrow).
c. Peripheral thick enhancement pattern is noted on contrast enhanced T1-weighted image (arrow).
all the visible lymph nodes on long TR image regardless of their sizes.

Generally, it is well-known that a large portion of the cervical tuberculous lymphadenitis patients have a history of previous tuberculosis or an active tuberculosis in lung and that the more inferior location of lymphadenopathy suggest the higher likelihood of concomitant pulmonary tuberculosis (5). In our study, eight patients (57%) had pulmonary tuberculosis and showed higher incidence of lower neck (N4) involvement than those without pulmonary tuberculosis.

The most common site of the cervical tuberculous lymphadenitis had been reported to be in posterior chain (3, 6, 7), while in our study, it was internal jugular chain(N2, N3, N4). The difference may be due to inclusion of many active pulmonary tuberculosis patients in this study.

After contrast enhancement, the characteristic CT feature of tuberculous lymphadenitis is described as a thick and irregular rim enhancement around the central necrotic area (3, 4, 6). On contrast enhanced MR images, however, most of the tuberculous lymph nodes showed thin peripheral rim enhancement although the pathologic findings revealed caseation necrosis. The exact causes for the discrepancy have not been proved and further study maybe required.

After anti-tuberculous medication, the necrotic form of tuberculous node converts into the solid form with

Fig. 3. a. Peripheral thin enhancement of the lymph node (arrow) is noted on contrast enhanced T1-weighted image.
b. Follow up contrast enhanced T1-weighted image after 3 months shows constant characteristics of affected lymph node (arrow) except the decrease of the nodal size.
c. In the same patient, another peripheral thin enhancement of the lymph node (arrow) is noted on contrast enhanced T1-weighted image.
d. Follow up image shows increase enhancing portion of affected lymph node(arrow).
decrease of its size (8). In our study, follow-up MR images of two patients, 3 months and 10 months in interval each, showed constant MR features of peripheral rim enhancement or increase of enhancing portion.

In conclusion, the characteristic MR features of cervical tuberculous lymphadenitis would be multiple, unilateral, well-margined lymph nodes which show homogeneous iso- or slightly high signal intensity on T1-weighted image, high signal intensity on T2-weighted and/or proton density images, and thin peripheral rim enhancement after contrast injection.

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경부 결핵성 림프절염의 자기공명영상 소견

조소연·김호철·배상훈·이열·이길우·김규선·이상조

목적: 경부에 발생한 결핵성 림프절염의 자기공명영상 소견을 제시함으로써 전이암이나 림프종과의 감별에 도움을 주고자 하였다.

대상 및 방법: 경부 종괴를 주소로 자기공명영상상을 시행한 환자중 결핵성 림프절염으로 확진된 14명의 환자를 대상으로 스피너토끼법의 T1, T2강조영상 또는 안자밀도 영상과 조영증강영상의 소견을 후향적으로 분석하였다.

결과: 경부 결핵성 림프절염으로 진단된 14명의 환자에서 총 97개의 림프절이 자기공명영상상에서 관찰되었다. 림프절은 대부분 8-45 mm의 다발성(n=12), 편측성(n=10)으로 주로 내경정맥을 따라 분포(N2: 41, N3: 2, N4: 21)하였다. 자기공명영상상의 신호 강도는 T1 강조영상에서 주변 근육과 동일하거나 약간 증가된 신호 강도로, T2 강조영상 또는 안자밀도 영상에서의 편측성, 평판성의 림프절 중대로 조영증강영상상에서는 대부분 변연부가 없고 균일하게 증강되는 변연부 조영증강형으로 관찰되었다(n=71)

결론: 경부 결핵성 림프절염의 특징적인 자기공명영상소견은 T1강조영상에서 주변 근육과 동일하거나 약간 증가된 신호 강도와 T2강조영상 또는 안자밀도영상에서 고신호강도의 다발성, 평판성의 림프절 중대로 조영증강영상에서는 없은 주변부 조영증강을 보이는 것이다.
제39회 의사전문의 자격시험 일정 안내

1. 일정표

'95. 11. 2(목)-9(목)
  시험시험 공고
11. 13(월)-11. 18(토)
  원서교부(의협)
11. 20(월)-11. 25(토)
  원서접수(학회)
12. 5(화)
  자격심사
12. 27(수)-12. 29(토)
  수험표 교부

'96. 1. 11(목)
  1차시험(장소미정)
1. 17(수)
  1차시험 발표(의협)
1. 22(월)
  2차 슬라이드 시험(장소미정)
1. 23(화)
  2차 구술시험(장소미정)
2. 2(금)
  2차시험 발표(의협)

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2. 구비서류

1) 응시원서(의협소정양식) .............................................1통
2) 수험표(의협소정양식) ................................................1통
3) 사진(반명함판, 제출서류 부착수량제외) .............................................2매
4) 합격자명부(의협소정양식) .............................................2통
5) 응시료(원서교부시 의협에 납부) .............................................60,000원
  수험료(원서접수시 학회에 납부) .............................................200,000원
  전문의제도 개선사업비( ) .............................................10,000원
  입회비( ) .............................................100,000원
  년회비( ) .............................................원
6) 수련과정 이수 또는 예정증명서(의협소정양식) .............................................2통
   (인터넷, 랜덤트 수련병원이 다출정우 분리 작성)
7) 해외 수련자인 경우 수련과정 이수증명서 사본 .............................................2통
   (해외 공관장 확인을 필한것)
8) 외국의 전문의 자격증을 취득한자의 경우 그 자격증 사본
   (해외 공관장 확인을 필한것) .............................................2통
9) 의사면허증 사본(규격 B5용지크기) .............................................2통
10) 피건수련 확인서 .............................................문양별 각1통
11) 전공의 기록부 ........................................................1부
12) 논문별책(원저 제1저자 1부, 공저2부) .............................................3부