

## Neuro - Behcet : 1

2 .

: Neuro - Behcet

: International Study Group for Behcet's Disease

Behcet

neuro - Behcet

8 가 7 , 가 1  
36 (28 - 47 ) 1.5 - T Signa  
Advantage(GE Medical system, Milwaukee, U.S.A.) Siemens 1.0 T Magnetom Expert,  
0.5 T Toshiba , , 3

: 8 7 . 7 , , ,  
6 , 5 , 1 ,  
가 ,  
6 5 , , 3  
가  
7 3  
7 5 (71%)  
: , , ,

neuro - Behcet

Behcet

nodosum), (uveitis)  
가 ,

20%

(1, 2).

Behcet

5%

가 (3, 4 - 6).

neuro - Behcet

가

(erythema

(7).

neuro - Behcet

1

2

2 , (corpus callosum) 1 .  
 (pons), (midbrain), (medulla oblongata), ,  
 , (thalamus), , 4  
 . 7 5 (71%)

Neuro - Behcet 8  
 . Behcet 1990 International Study Group for 가 1 (case 8),  
 Behcet's Disease (8). 가 1 (case 1) (Table).  
 , case 1  
 Behcet (Table).  
 6 5 , ,  
 8 , 6 , 7 , 4 , Pathergy 88%,  
 1 . 36 (28 - 47 ) 50% (72%)  
 가 7 , 가 1 .  
 1.5 - T Signa Advantage (GE Medical T1  
 system, Milwaukee, U.S.A.) Siemens 1.0 T Magne - tom . 3  
 Expert, 0.5 T Toshiba T1 (500 - 560/10 - , 3 (43%)  
 20 msec, TR/TE) , T2 (3500 - 4000/80 -  
 110 msec, TR/TE) 3 mm (case 1, 3, 5). 4 ,  
 (thin section) T2 . MR 6 , 1 , , ,  
 angiogram 3D PC 3D TOF . T2 가  
 . 가  
 , , ,  
 . 3  
 3 가  
 . (case 5, 6, 8). Case 5  
 4 , (brachium  
 pontis), (cerebral peduncle), (pyramid),  
 , , ,  
 8 7  
 . 7 (brain stem) 5 4  
 6 (86%), (internal capsule)가 4 ,  
 (basal ganglia) 3 , 2 , (temporal lobe) Wallerian

**Table.** Distribution, Signal Intensities, and Enhancement Patterns of the Lesions on Magnetic Resonance Imaging

Case No.	Age /Sex	Distribution	TI	T1WI	T2WI	Enhancement
1	29/M	BG, IC	5	I + C	H	-
2	47/M	Pons, MB, BG, Thal, IC	2	L	H	N
3	28/M	MO, Pons, MB, CC	10	I + C	H	N + L + R
4	39/F	MO, Pons, MB, BG, Thal, Temp	9	L	H	-
5	32/M	MO, Pons, MB, IC, Temp	10	L + C	H	N + M
6	46/M	MO, Pons, MB, IC	5	L	H	M
7	38/M	Dural sinus thrombosis	6	-	-	-
8	32/M	MO, Pons, MB	10	L	H	R

BG: Basal Ganglia, IC: Internal Capsule, MO: Medulla Oblongata, MB: Midbrain, Temp: Temporal lobe, Thal: Thalamus

TI: Time Interval (Days) of Onset of Neurologic Symptoms and MR Scanning

L: Low Signal Intensity, I: Isosignal Intensity, H: High Signal Intensity

N: Nodular , L: Linear, M: Marginal, R: Ring

. Case 6

13

(tegmentum)

. Case 8

11

7 5 (71%)

5

3

3

1

2

2

MR angiogram 2 (case 1, 7)

. 1

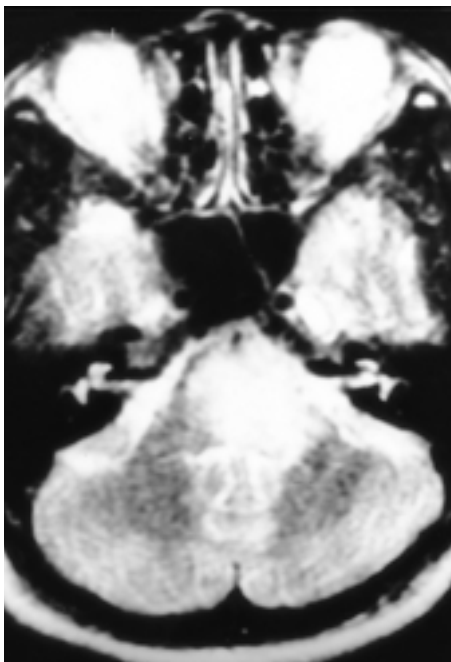
(case 7) MR arteriogram

MR

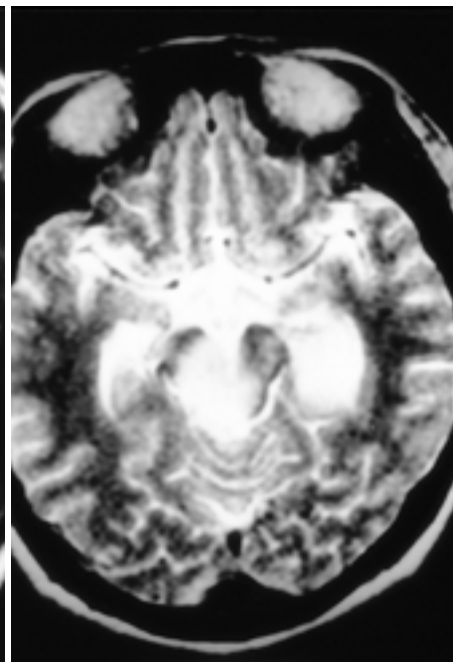
venogram

1 (case

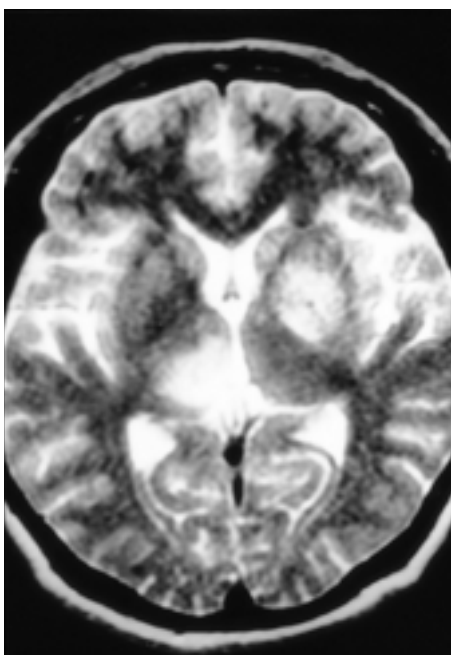
1) MR arteriogram



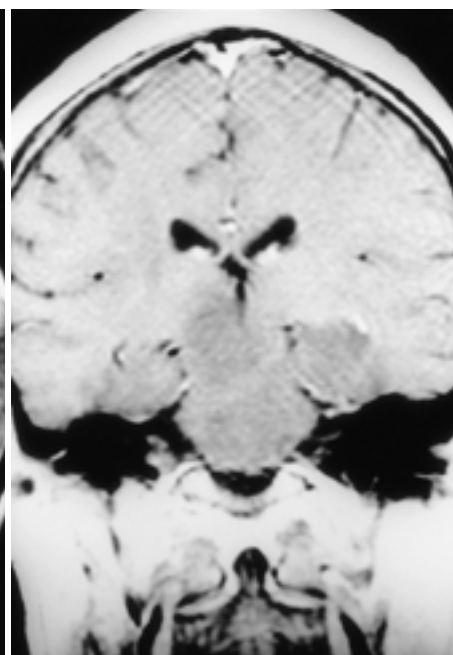
A



B



C



D

**Fig. 1.** Case 5. T2-weighted axial images (**A-C**) show poorly defined, extensive high signal intensity neuro-Behcet lesions in pons, midbrain, both side temporal lobes, right thalamus, and left basal ganglia. Contrast-enhanced T1-weighted coronal image (**D**) shows low signal intensity of the lesions with little mass effect to adjacent structures. There is no contrast enhancement of the lesions.

(immune -

related)

3 (triple symptom complex)

(2, 3, 9). Behcet

(pol -

arthrititis),

(thrombophlebitis),

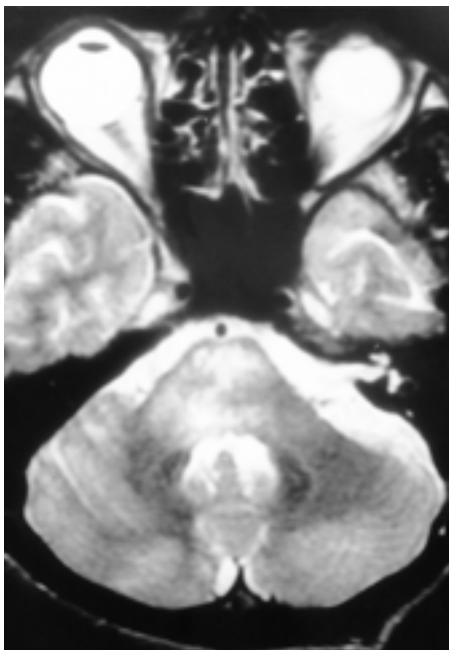
(portal hypertension)

Behcet  
1937 Hulusi Behcet (2)

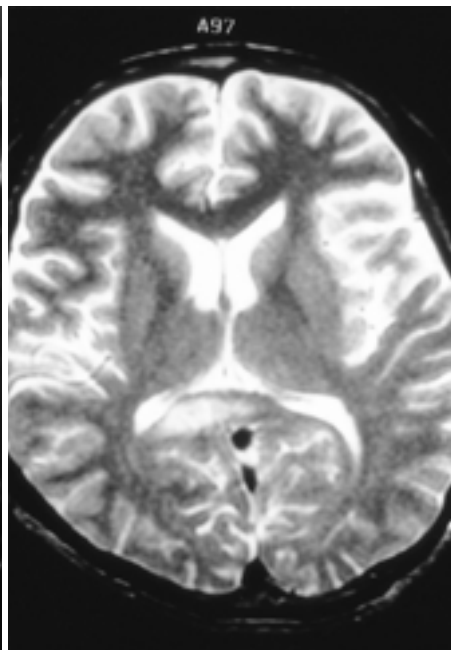
Behcet  
Behcet

가  
1 Hulusi Behcet

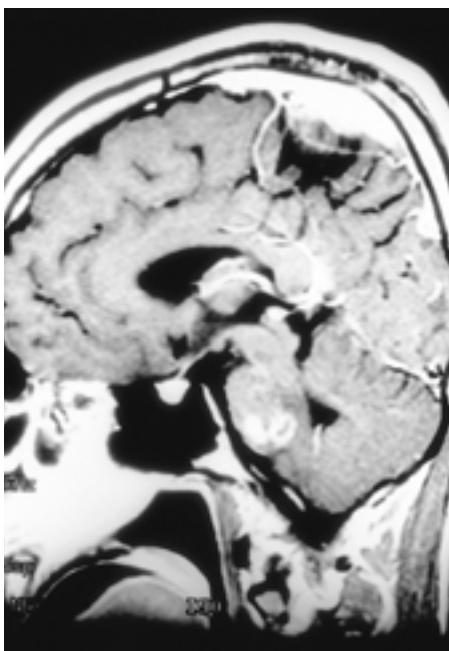
Behcet



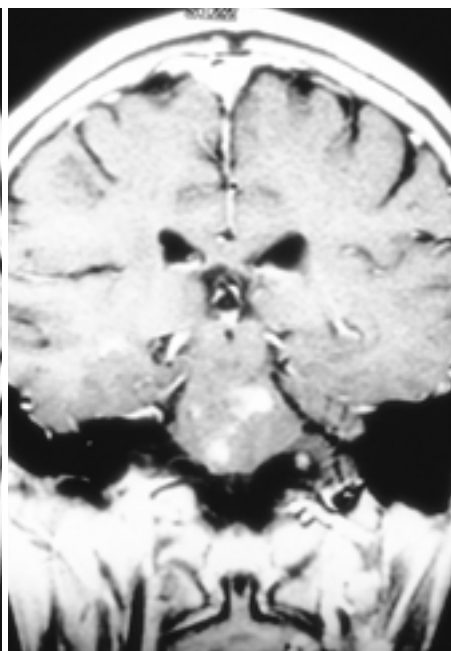
A



B

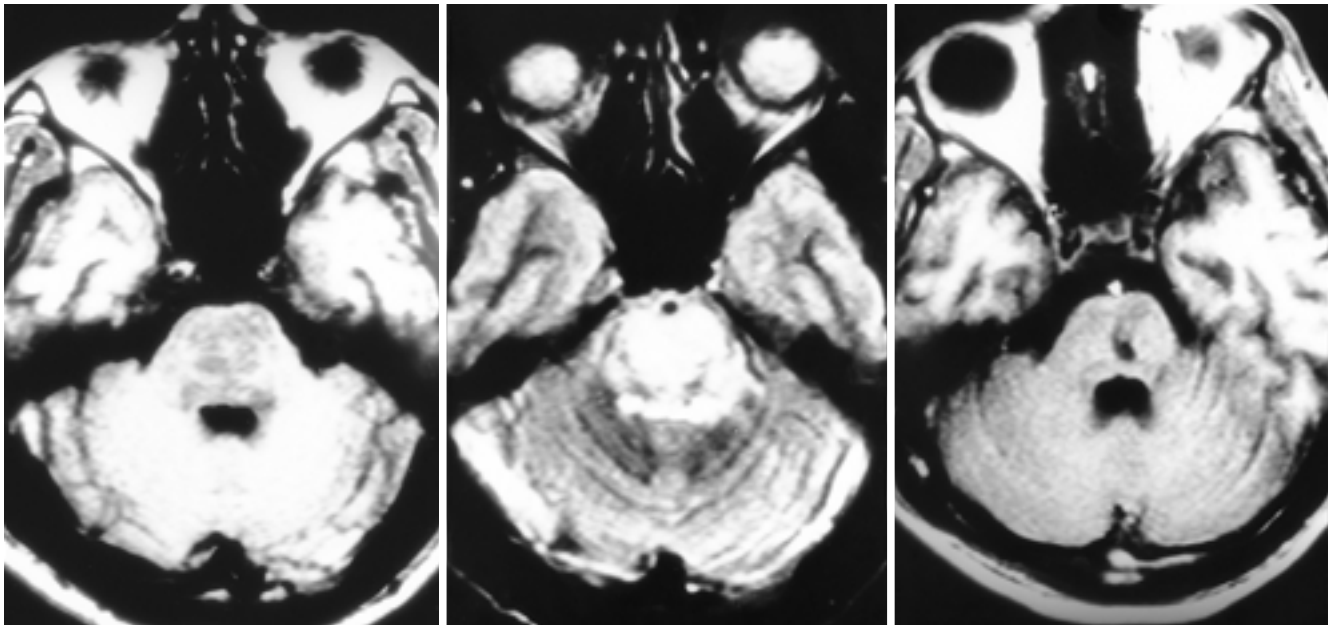


C



D

**Fig. 2.** Case 4. T2-weighted axial images (A, B) show high signal intensity lesions in pons and splenium of corpus callosum. Contrast-enhanced T1-weighted sagittal (C) and coronal (D) images show multifocal nodular, ring, and linear contrast-enhancement of the lesion in pons.



**Fig. 3.** Case 5. Development of cavitory lesion on follow-up examination (C) one month after initial MR study (A, B). T1-weighted (A) and T2-weighted (B) axial images show prolongation of both T1-and T2- relaxation time of the lesion in pons. T1-weighted axial image (C) one month after initial study shows cavitory lesion in basis pontis.

(2, 3, 6, 8 - 11). Innaba (12) (subcor -  
tical gray matter) , ,  
(chronic relapsing inflammatory cel -  
lular infiltration) (brain soft -  
ening) . neuro - Behcet ,  
Behcet 5.3% 44%가 (venule)  
(meningoencephalitis) (medullary vein) (subependy -  
mal vein) (cortex) (col -  
(encephalomyelitis) (1, 2, 7, lateral channel)가 가  
13). Neuro - Behcet , (brain  
stem syndrome), , (meningoencephalitic  
syndrome), , (organic confusional syndrome)  
가 (13).  
Neuro - Behcet . 가  
9 7 (78%)가 가  
28 47 ( 37 ) neuro - Behcet  
(2, 7, 14). 가 (15 - 18).  
(lacunar infarction) T1 ,  
neuro - Behcet , T2  
가 (2). ,  
neuro -  
Behcet .  
1 (13, 14). neuro - Behcet  
가 .

. Neuro - Behcet (gliosis), (corticosteroid) (immunosup - pressive drug) (3, 19 - 21). 3 (2, 23). Osmotic myelinolysis 가 (25, 26). neuro - Behcet 3 가 3 4 , 6 , 1 가 Behcet

(71%) 가 . Erdem (22) (blood brain barrier) 3 가 Neuro - Behcet (rhombencephalitis), neuro - Behcet , osmotic myelinolysis neuro - Behcet (plaque) neuro - Behcet 가 (20, 22 - 24). 가 (10). (2). Neuro - Behcet

1. Serdaroglu P, Yazici H, Ozdemir C, Yurdakul S, Bahar S, Aktin E. Neurologic involvement in Behcet's syndrome: A prospective study. *Arch Neurol* 1989;46:265-269
2. Banna M, el-Ramahl K. Neurologic involvement in Behcet disease: Imaging findings in 16 patients. *AJNR Am J Neuroradiol* 1991;12:791-796
3. Patel DV, Neuman MJ, and Hier DB. Reversibility of CT and MR findings in neuro-Behcet disease. *J Comput Assist Tomogr* 1989;13(4):669-673
4. Hermans PE, Goldstein NP, Wellman WE. Mollaret's meningitis and differential diagnosis of recurrent meningitis. *Am J Medicine* 1972;52:128-140
5. Kone-Paut I, Chabrol B, Riss JM, Mancini J, Raybaud C, Garnier JM. Neurologic onset of Behcet's disease: a diagnostic enigma in childhood. *J Child Neurol* 1997;12:237-41
6. Sharief MK, Hentges R, Thomas E. Significance of CSF immunoglobulins in monitoring neurologic disease activity in Behcet's disease. *Neurology* 1991;41:1398-1401
7. Wechsler B, Dell'Isola B, Vidailhet M, et al. MRI in 31 patients with Behcet's disease and neurological involvement: prospective study with clinical correlation. *J Neurol Neurosurg Psychiatry* 1993;56:793-798
8. International Study Group For Behcet's Disease. Criteria for diagnosis of Behcet's disease. *Lancet* 1990;335:1078-80
9. Yazici H, Pazarli H, Barnes CG, et al. A controlled trial of azathioprine in Behcet's syndrome. *N Engl J Med* 1990;332:281-285
10. Bahar S, Coban O, Gurvit IH, Akman-Demir G, Gökyigit A. Spontaneous dissection of the extracranial vertebral artery with spinal subarachnoid haemorrhage in a patient with Behcet's disease. *Neuroradiology* 1993;35:352-354
11. Tonami H, Tamamura H, Kimizu K, et al. Intraocular lesions in patients with systemic disease: Findings on MR imaging. *AJNR Am J Neuroradiol* 1990;10:1185-1189
12. Inaba G. Behcet's disease. Pathogenetic mechanism and clinical future. Tokyo:Univeristy of Tokyo Press, 1982
13. Kataoka S, Hirose G, and Tsukada. Brain stem type neuro-Behcet's syndrome. *Neuroradiology* 1989;31:258-262
14. Gerber S, Biondi A, Dormont D, Wechsler B, Marsault C. Long-term MR follow-up of cerebral lesions in neuro-Behcet's disease. *Neuroradiology* 1996;38:761-768
15. Kazui S, Naritomi H, Imakita S, Yamada N, Ogawa M, Sawada T. Sequential gadolinium-DTPA enhanced MRI studies in neuro-Behcet's disease. *Neuroradiology* 1991;33:136-139
16. Fukuyama H, Kameyama M, Nabatame H, et al. Magnetic reso-

- nance images of neuro-Beçet syndrome show precise brain stem lesions. Report of a case. *Acta Neurol Scand* 1987;75:70-73
17. Hadfield MG, Aydin F, Lippman HR, Sanders KM. Neuro-Beçet 's disease. *Clin Neuropathol* 1997;16:55-60
  18. Morrissey SP, Miller DH, Hermaszewski R, et al. Magnetic resonance imaging of the central nervous system in Beçet 's disease. *Eur Neurol* 1993;33:287-93
  19. Yamamori C, Ishino H, Inagaki T, et al. Neuro-Beçet disease with demyelination and gliosis of the frontal white matter. *Clin Neuropathol* 1994;13:208-15
  20. Tali ET, Atilla S, Keskin T, Simonson T, Isik S, Yuh WT. MRI in neuro-Beçet 's disease. *Neuroradiology* 1997;39:2-6
  21. Kermode AG, Plant GT, MacManus DG, Kendall BE, Kingsley DPE, Moseley IF. Beçet 's disease with slowly enlarging midbrain mass on MRI: Resolution following steroid therapy. *Neurology* 1989;39:1251-1252
  22. Erdem E, Carlier R, Idir ABC, et al. Gadolinium-enhanced MRI in central nervous system Beçet 's disease. *Neuroradiology* 1993; 35: 142-144
  23. Coban O, Bahar S, Akman-Demir G, et al. A controlled study of reliability and validity of MRI findings in neuro-Beçet 's disease. *Neuroradiology* 1996;38:312-316
  24. Motomura S, Tabira T, and Kuroiwa Y. A clinical comparative study of multiple sclerosis and neuro-Beçet 's syndrome. *J Neurol Neurosurg Psychiatry* 1980;43:210-213
  25. Miller GM, Baker HL Jr, Okozaki H, Whisnant JP. Central pontine myelinolysis and its imitators: MR findings. *Radiology* 1988;168: 795-802
  26. Koci TM, Chiang F, Chow P, et al. Thalamic extrapontine lesions in central pontine myelinolysis. *AJNR Am J Neuroradiol* 1990;11: 1229-1233

## Neuro-Beçet 's Disease: Diagnostic Usefulness of MR Imaging<sup>1</sup>

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**Purpose:** To suggest the characteristic MR features and to evaluate the usefulness of MR imaging for the diagnosis of neuro-Beçet 's disease.

**Materials and Methods:** We retrospectively reviewed the MR findings of clinically confirmed neuro-Beçet 's disease in eight patients (M:F = 7:1) ranging in age from 28 to 47 (average, 36) years. The findings were analyzed in terms of the most frequently occurring sites, signal intensities, contrast enhancement, and the changing patterns seen on follow-up MR examination.

**Results:** Seven of the eight patients had parenchymal brain lesions and the other had dural sinus thrombosis without brain parenchymal brain abnormality. In descending order of frequency, lesions involved the pons, midbrain, medulla oblongata, internal capsule, basal ganglia, thalamus, temporal lobe, and corpus callosum. The brain stem was involved in six patients, five of whom showed extensive involvement of the entire stem. In five patients, brain stem lesions showed supratentorial involvement, and in one, involvement of this region only was noted. Signal intensities of the lesions were poorly defined and extensive, especially in the brain stem, and usually showed prolongation of both T1 and T2 relaxation time. Three patients underwent follow-up examination, and this showed that while most lesions had disappeared in time, some had become small and cavitary. Initial MR examination showed that three patients had newly developed lesions as well as cavitary foci, suggesting the recurrence of disease. Contrast enhancement was noted in five of seven patients (71%), and various types, including nodular, linear, marginal, and ring.

**Conclusion:** The MR features of neuro-Beçet 's disease were fairly characteristic, and in clinically unsuspected patients might be diagnostically useful.

**Index words :** Brain, MR  
Beçet disease  
Vasculitis

	26 ( )					27 ( )					28 ( )				
	A	B	C	D		A	B	C	D		A	B	C	D	
08:00															
08:30	CC NR	CC CR				CC NR	CC CR				CC NR	CC CR			
09:00	(1-3)	(1-3)				(4-6)	(4-6)				(7-9)	(7-9)			
09:30						SL I					Symposium (PACS)				
10:00															
10:30															
11:00					( )					( )	SL II				
11:30					( )					( )	(Robert Mattrey, M.D.)				
12:00											Panel Discussion ( )				
12:30	/					/									
13:00	Plenary Lecture														
13:30 13:40						What's New									
14:00															
14:20 14:30	:					Coffee Break									
14:50	:														
15:00	,														
15:30 15:40															
16:00	Coffee Break														
16:10					( )					( )	,				
16:30					( )					( )					
17:00					( )					( )					
17:30															
18:00															
18:30						Reception									
19:00															

CC : Categorical Course

SL : Special Lecture

NR : Neuro Radiology

CR : Chest Radiology