医学影像专业英语

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序

古人曰:工欲善其事,必先利其器。外国语是学习国外先进经验,获取新知识的一个锐利武器。熟练地掌握有关外语,是作为一名合格的临床医师必不可少的条件之一,在当今的信息时代,尤其如此。

加强专业外语教学,是使学生在具备了一定外语基础之后,尽快向实际应用阶段转化的桥梁,是大学外语教学的重要环节。医学影像学是近年兴起的一门新的医学分支,其专业涉猎面之广,知识更新之快,甚于其他医学分支。从事该领域工作的医务工作者专业外语的素养也就格外重要。亟待有一本好的实用的影像专业英语教科书问世。

皖南医学院医学影像专业的张平洋、陈方满诸先生,集自身多年教学、医疗、科研的丰富经验,编撰的《医学影像专业英语》一书,适时地填补这个空白。编写中,作者根据读者已具备的基础英语水平,精选了35篇英语文献资料,范围涵盖各三级学科,内容注重临床实际,选材难易适度,编排循序渐进。这是供医学影像专业本科生、研究生教学使用的一本不可多得的教科书,也是供本专业医务工作者自学、研修,提高专业外语水平的一本极好的参考书。附录部分给出的参考译文、示范报告、专业词汇术语,全面准确,提高了本书的实用价值及学术意义。

我于医学影像学是门外汉,以上赘言似有班门弄斧之嫌。但拜读书稿,确实深受启发、鼓舞,爰缀数语,藉示欣赏推崇之意,相信读者会有更高的评价。

宋建国

2002年7月

前　言

1999年颁布的《英语教学大纲》(修订本)中明确指出,在完成基础阶段的学习任务,达到四级或六级水平后,学生都应修读专业外语。由此可见,进入应用阶段的专业外语学习是大学英语教学中重要且必不可少的部分。教学大纲已经为专业英语的教学指明了方向。

医学影像学是近年来蓬勃发展的新学科,它主要包括放射诊断学、超声医学、CT、核磁共振、影像核医学及介入放射治疗学等。众所周知,了解各种医学影像设备及其使用方法,学习各种先进检查技术及其操作和图像识别技能,均需要扎实的医学影像专业英语知识,可以说,由于医学影像学专业的特点及近年的迅猛发展,专业英语教学在医学影像专业教学中显得尤为重要。

医学影像专业英语应该紧紧围绕医学影像学的专业来进行。我校近年成功开设了医学影像本科专业,办学宗旨是要为各级各类医疗卫生单位输送高级医学影像专业实用型人才。在教学实践中我们发现专业英语的开设是办学成功的基础之一。根据教育部《英语教学大纲》的精神,结合医学影像专业的特点及从教学中获得的一些经验体会,我们在医学系芮景主任的领导和支持下编写了这本《医学影像专业英语》作为教学用书。该书正文部分共分35课,涵盖了影像学所有三级学科,各部分内容均包括临床常见疾病,且考虑到各影像学科在疾病诊断中的优势,注重临床实用性的原则;附录部分不仅有参考译文、典型示范报告,而且还较完整地列出了临床常用的专业词汇及术语的英汉对照表,以期能为医学影像专业的大学生、研究生、研修人员以及临床相关学科医务人员的学习提供帮助。也为医学影像专业的专业英语教材建设贡献微薄之力。根据我们的经验和体会,本书第一部分放射诊断中的1,3,5,7,8,10,11,12,15,16篇;第二部分超声诊断中的第17,19,20,21,23,25篇;第三部分核医学的第29,31篇;第四部分介入放射学的第32,34篇,这20篇宜以40个学时进行讲授,其余各篇可作为自学内容。

由于目前国内医学专业英语教学尚处起步阶段,医学影像专业英语教学几乎还是空白,毫无经验可循。况且我们水平有限,缺乏编写经验,因此,疏漏难免,恳请读者不吝赐教!

编　者

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PART ONE RADIOLOGIC DIAGNOSIS

1. Imaging of Osteomyelitis in Children

Physiopathology

Osteomyelitis is by definition an infection of the bone and bone marrow, infective or suppurative osteitis is limited to the cortical bone, an infective periostitis refers to the contamination of the periosteal cloak around the bone. Septic (infectious) arthritis, when a joint is involved, is a surgical emergency in children.

Three different clinical entities may be identified: acute, subacute, and chronic osteomyelitis. This nosology relies on many factors, among which the host resistance is an important one, inadequate therapy may favor the emergence of subacute or chronic infection. Three routes of infection of bones and joints are possible: hematogenous, by contiguity, and by direct implantation by a penetrating wound or an infected foreign body.

Subacute osteomyelitis is a localized pyogenic process and Brodie's abscess constitutes a well-defined purulent infection of the bone surrounded by granulation tissue and sclerotic bone. The sequestrum is a piece of necrotic bone in a bone abscess or sterile cavity.

Chronic osteomyelitis is a continuous infection of low-grade type. Infection may be indolent for a long time before reactivation of the disease. Garre's sclerosing osteomyelitis is a form of chronic infection with significant cortical thickening or periosteal reaction.

Diagnostic Imaging of Osteomyelitis

Conventional radiography Plain radiographs should always be the first step in the imaging assessment of osteomyelitis, because they may provide clues for other pathologic conditions. The earliest sign is the deep soft tissue swelling. Further swelling involves the muscles and the superficial subcutaneous soft tissues. Bone destruction and periosteal reaction may be obvious but only 10 to 21 days after the onset of the disease. Comparative views of the contralateral limb may help appreciate the subtle early findings.

Computed tomography This modality allows a cross-sectional assessment in axial, sagittal, coronal, or oblique planes of the bone and surrounding soft tissues, its high contrast and spatial resolution give a good definition of cortical bone destruction, periosteal reaction, and of any sequestrum present. Soft tissue abscesses are well defined with a rim enhancement pattern post contrast injection. Intraosseous gas has also been reported in CT studies of some rare cases of osteomyelitis.

Magnetic resonance imaging. MR imaging and CT are very useful in detailing the osseous changes and the soft tissue extension of osteomyelitis in the spine, pelvis, and the appendicular skeleton. Findings by MR imaging truly reflect the pathologic process. In early osteomyelitis the edema and exudates of the medullary space account for the ill-defined low signal intensity on T_1-weighted images and the high signal on T_2-weighted or short time inversion re-

covery (STIR) images. Poorly defined soft tissue planes, lack of cortex thickening, and poor interface between normal and abnormal marrow are good predictors of early osteomyelitis. Turbo inversion recovery magnitude sequences show similar quality and fat suppression as STIR imaging, but they have a shorter acquisition time.

Gadolinium enhancement in involved structures represents viable tissues with intact or increased vascularity, whereas a rim enhancement indicates inflammation surrounding a necrotic or devitalized tissue. Sensitivity of MR imaging for osteomyelitis is reported at 88% to 100%, with a specificity of 75% to 100%. Fat suppression techniques overcome the pitfall of MR imaging signal of fat surrounding the enhancing tissue on T_1-weighted imaging with gadolinium. MR imaging protocol includes T_1 and T_2 sequences in orthogonal planes, Fast spin echo T_2 with fat suppression and STIR sequences are sensitive for signal abnormalities in marrow space and in soft tissues. Coronal or sagittal imaging is useful for planning of biopsy, debridement, and the assessment of the growth plates and epiphyses. Focal marrow enhancement is extremely sensitive for the diagnosis of osteomyelitis. This enhancement may not help distinguish infectious from noninfectious inflammatory conditions.

New words and expressions

osteitis [ˌɔsti'aitis] *n*. 骨炎
cloak [kləuk] *n*. 覆盖；*vt*. 掩盖
nosology [nəu'sɔlədʒi] *n*. 疾病分类学
regression [ri'greʃən] *n*. 回归，倒退，复归
gadolinium [ˌgædə'liniəm] *n*. 钆
viable ['vaiəbl] *a*. 能生存的，能活的
devitalize [di:'vaitəlaiz] *vt*. 失活，去生机
orthogonal [ɔ:'θɔgənl] *a*. 互相垂直的，正交的，直角的
debridement [debrid'mɔŋ] *n*. [法] 清创术

2. Tuberculous Spondylodiskitis

The vertebral column is the most common site of osseous tuberculous involvement, comprising in most series about 50% of cases. Patients present with long-standing and insidious onset of stiffness and local tenderness, with or without constitutional symptoms. The lower dorsal and upper lumbar vertebrae are most frequently affected, cervical and sacral involvement occurs uncommonly.

The classic picture of vertebral osteomyelitis is destruction of two or more contiguous vertebrae and end plates, disk infection, and commonly a paraspinal mass or collection. The infection typically commences at the superior or inferior anterior vertebral body corner adjacent to the diskovertebral junction, and spreads by subligamentous extension and penetration of the subchondral plate. Abscesses, often multiple, may track for considerable distances beneath the anterior or posterior longitudinal ligament, and may discharge by sinus tracts in unusual locations, such as groin, buttock, or chest. Advanced disease may demonstrate abscesses tracking along fascial planes: in the retropharyngeal space, above Poupart's ligment, and along the iliopsoas muscle. Large paravertebral abscesses, particularly if partially calcified, suggest the diagnosis of MTb

(musculoskeletal tuberculosis) and may be more conspicuous than bony changes. Because the disk is avascular, disk infection is seen late, with intervetebral space narrowing seen on plain film secondary to herniation of the disk into the undermined, collapsed vertebral body. When two contiguous vertebral bodies are involved, the nutrition of the disk is affected. Collapse and wedging of multiple vertebral bodies because of intraosseous cavitation results in the characteristic gibbus deformity.

Approximately 10% of cases of tuberculous spondylodiskitis have significant supervening neurologic complications; paraparesis and paraplegia can be secondary to meningomyelitis, spinal cord compression from retropulsed debris,or subarachnoid collections.

In addition to the typical of vertebral involvement, atypical patterns are increasingly observed. Although less common, infiltration of the posterior elements, infection of a single vertebra or multiple nonadjacent vertebrae, sparing of the disk, and reactive sclerosis are seen.

Imaging of Spinal Tuberculosis

Plain film evaluation of the tuberculous spondylodiskitis may demonstrate loss of vertebral height or disk interval narrowing, erosions, indistinction of the end plates, paravertebral masses, and sequestrae. Disk space narrowing may be quite subtle. Over 50% of the trabecular bone is lost before a lesion is conspicuous on plain film, this process may take up to 6 months. In the lumbar spine asymmetry or bulging of the psoas shadow may be detected. Scalloping of the anterior vertebral contour is more commonly seen with children. Plain film is limited in evaluation of the posterior arch, particularly in the thoracic spine. No specific or pathognomonic plain film signs distinguish tuberculous from pyogenic spinal infection, and correlation with the clinical presentation and duration of symptoms is essential. Bone scan of tuberculous spinal involvement is sensitive but nonspecific, providing limited anatomic resolution.

CT scan is excellent for visualization of end plate destruction, fragmentation of the vertebrae, and paravertebral calcifications. Inflammatory collection and masses are best seen after the administration of intravenous contrast. Extension into the canal of epidural abscesses and bony fragments are demonstrated on axial images. CT is used for guiding percutaneous biopsy and postdrainage follow-up.

Multiplanar capability and optimal tissue contrast make MR imaging the optimal modality for evaluation of spondylodiskitis. The entire spine and canal can be visualized, including the posterior elements. MR imaging has higher sensitivity for early infiltrative disease including end plate changes and marrow infiltration than bone scan and plain film. MR imaging affords excellent definition of epidural, paravertebral, and intraosseous abscesses, and extent of cord compromise. Paravertebral abscesses may be large, and discharge through tracts well seen on multiple planes. MTb-involved vertebrae show hypointense signal on T_1-weighted images and heterogeneous increase signal on T_2-weighted images. With late chronic MTb, signal is variable; T_1-weighted images may show decreased or increased signal. Hyperintense signal on T_1 in the setting of chronic infection may be specific to MTb. The intravenous administration of

contrast improves definition of epidural abscesses and masses, and cord and nerve root compromise. MTb abscesses show peripheral enhancement with central necrosis. Acute MTb shows inhomogeneous enhancement in areas of marrow infiltration and enhancing lesion borders.

New words and expressions

groin [grɔin] *n*. 腹股沟
buttock ['bʌtək] *n*. 半边屁股
poupart ligment [pu'pa:t] *n*. 腹股沟韧带
herniation [ˌhə:nieiʃən] *n*. 疝
undermine [ˌʌndə'main] *vt*. 暗中破坏,渐渐损害
wedge [wedʒ] *n*. 楔,楔形物;*vt*. 楔入
gibbus ['gibəs] *n*. 驼背
supervene [ˌsju:pə'vi:n] *vi*. 意外发生,附加,意外
paraparesis [ˌpærə'pærisis] *n*. 轻截瘫,下肢轻瘫
paraplegia [ˌpærə'pli:dʒiə] *n*. 截瘫,下身麻痹
meningomyelitis [məˌniŋ gəu:maiə'laitis] *n*. 脊髓脊膜炎
retroposed ['retrəupəuzd] *a*. 后移的
subarachnoid [ˌsʌbə'ræknɔid] *a*. 蛛网膜的
decompression [ˌdi:kəm'preʃən] *n*. 减压,解压
visualization [ˌvizjuəlai'zaiʃən] *n*. 想像,显影,造影术
bulge [bʌedʒ] *n*. 肿胀,膨出 *vt*. 肿胀,隆起
pathognomonic [pəˌθɔgnə'mɔnik] *a*. 特殊病症的,特定的
scallop ['skɔləp] *n*. 扇贝;*vt*. 使成扇形
epidural [ˌepi'djuərəl] *a*. 硬膜外的

3. Giant-cell Tumor (Osteoclastoma)

Giant-cell tumor is an uncommon tumor derived from skeletal connective tissue. Jaffe classes this as a quasimalignant tumor. The incidence of malignancy has been estimated at about 20%.

Microscopicall, ovoid or spindle-shaped cells in a vascular stroma and large multinucleated giant cells are seen. Osteoid may also be present. The appearance of the stromal cells and their ratio to giant cells are considered to be indicators of the malignant potential of the tumor.

Clinically, 75% of these lesions occur between the ages of 20 and 40 years. Males and females are affected equally. The chief complaint is an intermittent dull ache that may be associated with a palpable, tender mass. The prognosis is uncertain because the tumor may recur after excision or metastasize to the lungs. Malignant change or transformation into fibrosarcoma or osteosarcoma following radiation therapy is a hazard of that modality of treatment. Giant-cell tumor also occurs in association with Paget's disease.

When the diagnosis of giant-cell tumor is entertained, it is imperative to determine the serum calcium, phosphorus, and alkaline phosphatase levels in every case, because a brown tumor of hyperparathyroidism may simulate this lesion in every respect except metastases.

Radiologically, the classic location is in the distal femur or proximal tibia, extending to the articular surface, and off the central axis. The distal radius is another common site of long bone involvement, and the lesion has been reported in almost all tubular bones, as well as the patella, talus, and calcaneus. Mandibular involvement is rare, and brown tumors of hyperparathyroidism or giant-cell reparative granulomas have been mistaken for this lesion. Giant-

cell tumors of the vertebral column are rare except in the sacrum and may involve the body, pedicle, or other portions of the neural arch. The majority of radiologically similar lesions actually represent aneurismal bone cysts. Rarely, the pelvis, ribs, or scapula may be involved. Multiple giant-cell tumors are very rare. It is difficult to distinguish a multicentric giant-cell tumor from a primary giant-cell tumor that has metastasized. Multiple lesions tend to exhibit the same aggressive behavior as a solitary giant-cell tumor.

The classical appearance is a moderately sized expansile radiolucent lesion that may be eccentric or involve the entire diameter of the bone end, extending to the immediate subarticular cortex. The lesion is usually round. At times, no trabeculations are seen. Heavy trabeculation is not usual in an uncomplicated lesion, and its occurrence or a "soap bubble" appearance suggests postradiation change or recurrence. The margin of the area of circumscribed osteolysis is fairly well defined, but there is usually no sclerotic rim, The periosteum is expanded and thinned or segments may be seen, owing to destruction. There is characteristically no periosteal elevated new bone formation over the expanded area, even when pathological fracture occurs. Very rarely, some calcification within the tumor can be seen. The cortex may be broken through and the soft tissue invaded with the formation of a soft-tissue mass. This is said to occur in both malignant and benign varieties. When a short tubular bone is involved, there is expansion of the bone end and a portion of the diaphysis.

Computed tomography is of value in this lesion to demonstrate the presence and extent of any soft-tissue component, to assess the intraosseous extent, to demonstrate the integrity of the cortex, and to evaluate the postoperative state. Contrast-enhanced CT provides the most useful and complete information about soft-tissue extent and relationship to major vessels. Angiography is valuable when the extraosseous extent and vascular relationships were not defined on CT. Arthrotomography is claimed to be the best way to evaluate tumor invasion through subchondral cortex and articular cartilage. If the lesion involves the cervicothoracic spine, CT is the imaging method of choice for defining the extent of tumor because it can show the entire picture of bone involvement, spinal canal encroachment, and soft-tissue extension.

The angiographic features of giant-cell tumor are very similar to those of aneurismal bone cyst. Giant-cell tumor is the most vascular benign bone tumor. There is early visualization of variable-sized vascular spaces, along with an uneven and prolonged tumor stain. Early venous filling and abnormal veins are noted. There is no vascular encasement or invasion. Avascular tumors are rare.

Magnetic resonance images have been reported in patients with giant-cell tumor. The images reveal bone marrow replacement by tumor, cortical bone thinning, and cortical bone destruction. The extent of tumor can be delineated. The signal intensity is lower in tumors, suggesting altered relaxation times. Proton magnetic resonance imaging can provide high-resolution images of extremities and detect tumors by changes in both anatomical structure and relaxation times.

New words and expressions

stroma ['strəumə] *n*. 基层，基质
imperative [im'perətiv] *a*. 绝对必要的，迫切的；命令，规则
hyperparathyroidism [ˌhaipə(:)pæprə'θairɔidizəm] *n*. 甲状旁腺功能亢进
patella [pə'telə] *n*. 髌骨
talus ['teiləs] *n*. 距骨
calcaneus [kæl'keiniəs] *n*. 跟骨
epiphyseal [ˌepi'fiziəl] *a*. 骺的
mandibular [mæn'dibjulə] *n*. 下颌骨
granuloma [gænju'ləumə] *n*. 肉芽肿
scapula ['skæpjulə] *n*. 肩胛骨
radiolucent [ˌreidiəu'lju:snt] *a*. 射线透射的
encase [in'keis] *vt*. 把……装箱，围，包装
proton ['prəutɔn] *n*. 始基，质子

4. Osteosarcoma

Osteosarcoma is a primary malignant tumor of bone in which osteoid is formed directly from sarcomatous tissue.

Osteosarcoma may be grouped by location as central, parosteal sarcoma, multiple osteogenic sarcomatosis, and soft-tissue osteosarcoma. The clinical picture and prognosis are different for each.

Microscopically, the typical appearance consists of osteoid arising directly from neoplastic cells. The amount and calcification of this osteoid may vary greatly, along with the amount of cartilage that may be present. The lesion may be highly vascular.

Recently, there has been a tendency to subclassify osteosarcomas on the basis of different clinical and histological features. About 75% of the tumors are still considered conventional osteosarcomas. The remainder fals into small subgroups that are distinctive.

Clinically, osteosarcoma is the second most common primary sarcoma of bone component tissue. The ratio of involvement of males and females is about 2:1. Most of these tumors arise in the 10- to 25-year age bracket. In younger patients, osteosarcoma most often involves the tubular bones. When it occurs in older persons, the flat bones are most often involved.

In the vast majority of instances, the tumor metastasizes by way of the bloodstream, The most common site of metastasis is the lungs. In very rare instances, metastases may spread by way of the lymphatics. The pain begins insidiously at intermittently and progresses to severe constancy. Palpable mass develops, with associated inflammatous signs and local venous dilatation. Effusion in a contiguous joint is common. Pathological fracture may occur. The serum alkaline phosphatase level is usually slightly elevated in the presence of a large lesion.

Radiologically, the areas most commonly involved in central osteosarcoma are the distal femur and the proximal tibia. This is seen in about 75% of the cases in which tubular bones are affected. In the tubular bones, the tumor usually originates in the metaphysis. Rarely, the tumor may originate in the diaphysis. Diaphyseal osteosarcomas have been reported to occur in 9.5% of long bone lesions. The clinical and histological features were indistinguishable from those of metaphyseal osteosarcomas.

Another rare variation is a high-grade surface osteosarcoma. It is clinically aggressive and must be differentiated from periosteal sarcomas.

The term osteosarcoma refers to the histological production of osteoid, not to the roentgen appearance of sclerosis. The tumor may show a dense sclerosing roentgen picture in about 50% of cases or a moderately ossifying appearance, a mixed productive and destructive appearance, or rarely a pure osteolytic lesion. These variations in density depend on the amount of calcified osteoid and vascularity present and do not represent basic differences in type of tumor. Bone sclerosis may be of extreme density, but extreme bone density is not pathognomonic of this condition because other conditions such as Charcot's joint, osteoid osteoma or sclerosing osteomyelitis may also induce bone densities as osteosclerotic as osteosarcoma. When the lesion is lytic, the pattern is "moth-eaten" or permeative with ill-defined margins blending imperceptibly with normal uninvolved bone and a characteristic wide zone of transition. A "geographic" area may rarely be seen.

The appearance of the periosteum is the best known feature of this lesion. In the classic case, the typical filiform radiating spiculation or "sunburst" pattern is seen. A long segment pattern of spiculation may also be present. Spiculated periosteal reaction may also be seen in metastatic tumors, particularly carcinoma of the prostate, as well as benign conditions such as osteomyelitis and thyroid acropachy. Malignant spicules tend to be long and thin, whereas benign spicules are short and squat. Rarely, other cases may show lamellated periosteal response. A Codman's triangle is often present. This triangle may, however, also be found in benign conditions. Rarely, an expansile lesion in a flat bone is seen.

Another characteristic finding in osteosarcoma is destruction of the cortex and invasion of the soft tissues. The soft-tissue mass may be very large. Areas of ossification or amorphous calcification may be present in the soft-tissue mass.

Computed tomography is now a modality of proven value in the radiological work-up of osteosarcoma and other primary bone and soft-tissue tumors. It should be considered as an adjunct to the conventional radiographic examination. Particularly in the central skeleton, CT can accurately determine the extent of the soft-tissue component of a primary bone tumor. Intravenous contrast enhancement is principally of use to determine the relationship of the soft-tissue mass to the major vessels. The bony portion of the tumor is said not to enhance. Calcification within the tumor matrix can be detected more readily than with conventional methods. CT is invaluable in defining the status of the medullary cavity.

The normal medullary cavity has a fat density of -50 to -80 Hounsfield units. When the medullary cavity is involved with tumor, the density is significantly increased. The extent of involvement is usually greater than that seen on plain films. This finding can distinguish various types of osteosarcomas. Parosteal sarcomas have no medullary involvement, only parosteal and soft-tissue components. Conventional osteosarcomas have both soft-tissue and medullary involvement. Infection can cause similar changes in marrow density numbers. CT can accurately define anatomical relationships. In limb lesions, if the intravenous contrast ma-

terial is injected distal to the lesion, the vascular bundle can be demonstrated. If it is not seen, it should be assumed that the lesion has invaded the vessels. If the vascular bundle abuts the lateral edge of the soft-tissue component, it may not indicate invasion of the vascular bundle, but only displacement.

Radionuclide bone scans of osteosarcoma can demonstrate increased uptake by the tumor. This is not particularly useful because the tumor is almost always evident on conventional radiographs. They can also detect bony metastases and, in rare cases, multiple osteosarcomas. Radionuclide bone scans are particularly useful in the follow-up of patients on chemotherapy and can also give information about the anatomical extent of the tumor.

Angiography of osteosarcoma is of value for determining the intraosseous and extraosseous extent of the tumor, as well as the selection of a biopsy site. Osteosarcomas are vascular tumors, with fibroblastic and chondroblastic subtypes less vascular than conventional osteosarcoma. This technique also aids in differentiation from other lesions, such as healing fractures, myositis ossificans, and osteomyelitis. The vascular supply of an osteosarcoma arises from the surrounding tissues.

New words and expressions

osteoid ['ɔstiɔid] *a*. 骨样的，类骨质
parosteal [pæ'rɔtiəl] *a*. 骨旁的，骨膜外的
anaplasia [ˌænə'pleiziə] *n*. 退行发育，间变
bracket ['brækit] *n*. 段
intermittent [ˌintə'mitənt] *a*. 间歇的，周期性的
palpable ['pælpəbl] *a*. 可触知的
Roentgen ['rɔntjən] *n*. 伦琴
osteolytic [ˌɔstiəu'litik] *a*. 溶骨的
filiform ['filifɔ:m] *a*. 线形的
spiculate [spikjulit] *a*. 针状的，刺状的
acropachy ['ækrəuˌpæki] *n*. 杵状指
squat [skwɔt] *n*. 蹲 坐；*vt*. 使蹲下
amorphous [ə'mɔ:fəs] *a*. 无定形的
matrix ['meitriks] *n*. 基层，基质
abut [ə'bʌt] *vi*., *vt*. 比邻，接界
radionuclide [ˌreidiəu'nju:klaid] *n*. 放射性核素
angiography [ˌændʒi'ɔgrəfi] *n*. 血管造影术
fibroblastic [ˌfaibrəu'blæstik] *n*. 成纤维细胞
chondroblastic ['kɔndrəu'blæstik] *n*. 成软骨细胞
myositis [ˌmaiəu'saitis] *n*. 肌炎

5. Lobar Atelectasis

Lobar atelectasis means loss of lung volume with reduced inflation of a segment or a lobe. There are several mechanisms of lobar atelectasis, the most frequent being bronchial obstruction. The major radiological signs of lobar atelectasis are opacity of the lobe and evidence of loss of volume of the lobe. Opacity results from the presence of intra-alveolar fluid in the case of obstructive atelectasis or passive atelectasis or from scarring or lung fibrosis in the case of cicatrization atelectasis. Occasionally, the affected lung may contain air and may appear relatively normal in transparency on the radiograph and in attenuation on CT scans, especially in the presence of an incomplete fissure. The signs of loss of volume include direct signs such as displacement of fissures, pulmonary blood vessels and major bronchi, and shift of other structures

to compensate for the loss of volume. In the case of obstructive atelectesis, the presence of a large mass located in a parahilar situation may produce a bulge in the contour of the collapsed lobe. The phenomenon is called Golden's sign. Compensatory overinflation of the adjacent lobe results in spreading out of the vessels within that lobe. The mediastinal shift accompanying lobar atelectasis is of variable degree. Generally, it is greatest with lower lobar atelectasis and with cicatrization upper lobe atelectasis, moderate with acute upper lobe atelectasis and absent in the case of right middle lobe atelectasis. Displacement of the anterior mediastinal fat, and displacement of the trachea are by far the most reliable signs. Hemidiaphragm elevation is another sign of compensatory shift. This sign is of limited value. It is mainly recognizable in cases of atelectasis of the lower lobe or left upper lobe. Inward displacement of the chest wall causing narrowing of the spaces between the affected ribs is only seen with a severe atelectatic lobe. It is much easier to recognize with CT than the radiograph.

Right Upper Lobe Atelectasis

When the right hilum become elevated, the major and minor fissures are displaced upwards and rotated towards the mediastinum. As a result, the collapsed lobe packs against the mediastinum and lung apex. Compensatory overinflation of the right lower lobe, especially of the superior segment, may lead to visualization of a sliver of lung invaginating between the mediastinum medially and the posterior aspect of the collapsed right upper lobe laterally. This results in a sharp lucent interface between the atelectatic lobe and the mediastinum on the chest radiograph, a phenomenon known as the Lutsichel sign, and a triangular configuration of the posteroinferior portion of the collapsed right upper lobe.

Left Upper Lobe Atelectasis

The hilum is displaced upwards and the major fissure forwards. The lobe retains much of its original contact with the anterior chest wall. The Lutsichel sign is far more commonly seen than in right upper lobe collapse. Displacement of the anterior mediastinum fat and displacement of the trachea towards the left are commonly present. The left hemidiaphragm is moderately elevated.

Right Middle Lobe Atelectasis

The collapsed right middle lobe is easily and reliably recognized on the lateral chest radiograph. The major and minor fissures move towards one another and the collapsed lobe resembles a curved, elongated wedge. The wedge tapers in two directions: medial to lateral, and anterior to posterior. The right hilum is not displaced. The right hemidiaphragm and mediastinum are in a normal position.

Right Lower Lobe Atelectasis

The major fissure rotates backwards and medially and the upper half of the fissure swings downward. As a result, the collapsed right lower lobe lies posteromedially in the lower thoracic cavity. The right hilum is displaced downwards and the hemidiaphragm is moderately elevated. Mediastinal fat and trachea are shifted to the right.

Left Lower Lobe Atelectasis

The fissure rotates backwards and medially and the upper half of the fissure swings downwards. As a result, the collapsed left lower lobe lies posteriomediatly in the lower thoracic cavity. The left hilum is displaced downwards, as well as the left main and upper lobar bronchi. Anterior mediastinal fat and trachea are shifted to the left. Flattening of the contours of the aortic knuckle and the adjacent main pulmonary artery, seen in severe collapse of the left lower lobe, is due to leftward displacement and rotation of the heart. This mediastinal modification is referred to the flat waist sign. The left hemidiaphragm is moderately elevated.

Combined Lobe Atelectasis

Combined right upper and middle lobe collapse is unusual because bronchi to these lobes arise from different locations. The appearance is virtually identical to that seen with left upper lobe collapse.

Combined right lower and middle lobe collapse is seen with obstruction to the intermediate bronchus. The major and minor fissures are both displaced downward and backward creating an opacity that obliterates the dome of the right hemidiaphragm. Right hilum, mainstem bronchus and upper lobar bronchus are displaced downward. The anterior mediastinal fat is markedly shifted to the right side.

Whole lung collapse is characterized by a marked shift of the mediastinum and heart to the affected side. The hemidiaphragm is elevated upwards. This feature is recognized radiographically only on the left side by the high position of the stomach bubble. Compensatory overinflation of the opposite lung moves across the midline, particularly anteriorly behind the sternum creating a large retrosternal airspace on the lateral view.

New words and expressions

lobe [loub] *n*. 叶
atelectasis [ˌæti'lektəsis] *n*. (肺) 膨胀不全,不张
collapse [kə'læps] *n*. 萎陷
bronchial [brɔŋkəl] *a*. 支气管的
radiological ['reidiou'lɔdʒikəl] *a*. 放射学的
cicatrization [ˌsikətrai'zeiʃən] *n*. 瘢痕形成
scan [skæn] *n*. *vt*. 扫描
fissure ['fiʃə] *n*. 裂
hilum ['hailəm] *n*. (肺)门
mediastinum [ˌmi:diæs'tainəm] *n*. 纵隔
inflation [in'fleiʃən] *n*. 膨胀,充气
segment ['segmənt] *n*. 段,节
opacity [əu'pæsiti] *n*. 不透明,不透光
alveolar [æl'viələ] *a*. 肺泡的

6. Bronchiectasis

Bronchiectasis is chronic irreversible dilatation of diseased bronchi. The prevalence of bronchiectasis depends on the socioeconomic conditions of the population. Bronchiectasis remains a major cause of morbidity in less developed countries where access to immunization and antibiotics is limited.

Pathologically, mononuclear cell infiltration is present in the bronchial wall. In more severe bronchiectasis there is degeneration of ciliated epithelium finally replaced by squamous or columnar epithelioma. The elastin layers of the bronchial walls are lost and there is destruction

of the bronchial muscle and cartilage. Constructive bronchiolitis has been documented in resected lobes of patients with severe bronchiectasis. The Reid's classification of bronchiectasis includes three patterns:

(1) cylindrical bronchiectasis in which dilatation of a section of bronchial tree is relatively uniform.

(2) varicose bronchiectasis in which local constrictions are superimposed on the cylindrical pattern.

(3) cystic bronchiectasis in which progressive dilatation of the airways leads to a balloon-like appearance. Cystic bronchiectasis represents the most advanced disease.

Currently, the classical features of patients with bronchiectasis reflecting severe disease and including production of large volumes of purulent sputum, finger clubbing, frequent infective exacerbation and recurrent haemoptysis are rarely observed. Most patients now have mild bronchiectasis with few or no any physical signs. Therefore the diagnosis is usually made by a high resolution CT examination requested because of persistent cough producing infected sputum. The identification of an underlying cause may result in specific treatment instituted in addition to measures including antibiotics, partial drainage and inhaled steroid treatment. The indication for surgical excision of the disease is localized disease with no underlying identifiable cause for recurrence.

Currently radiographic abnormalities are present in less than 50% of patients with bronchiectasis. Peribronchial inflammation may make the margins of pulmonary vessels indistinct, particularly in the lower lobes. With more severe bronchial inflammation and fibrosis, the bronchial walls themselves become visible as tramlines most obvious in the lower lobes, in the middle lobe or lingula. When seen end on, dilated bronchi may appear as ill-defined ring opacities, notably in the middle and upper zones. Dilated bronchi filled with pus and mucus lead to tubular and ovoid opacities sometimes assuming a gloved finger appearance. Cystic bronchiectasis results in multiple thin-walled ring opacities that may contain fluid levels. In advanced disease, the radiographic distinction from a coarse honeycombing pattern due to end-stage fibrotic disease may be difficult. Patchy peribronchial consolidation and focal areas of subsegmental collapse are commonly seen in diffuse disease. A lobe affected by bronchiectasis may be either overinflated or relatively collapsed.

HRCT is currently the imaging technique of choice for the detection of bronchiectasis. It replaced bronchography which has become obsolete. The most widely used protocol for bronchiectasis consists of 1-1.5mm collimation scans every 10mm from the lung apex to the diaphragm. For areas regarded as suspicious for bronchiectasis such interspacing can be reduced to 5 mm. Helical CT with thin collimation offers potential advantages including improved detection of subtle bronchiectasis missed between HRCT sections and reduced motion artifact. As compared to HRCT, helical CT has proven able to improve the accuracy of diagnosis of the segmental and subsegmental distribution of bronchiectasis. However, this improvement is obtained at the price of a greater radiation dose delivered to the skin. Helical CT is only recom-

mended in equivocal cases, in patients being assessed for surgery and in case of unexplained haemoptysis since in such a situation both bronchial tumour and bronchiectasis must be looked for. The cardinal sign of bronchiectasis is dilatation of the bronchi with or without bronchial wall thickening. CT findings of bronchiectasis depend on the orientation of the bronchus to the scan plane and the morphological type. For bronchi running parallel to the scan plane, cylindrical bronchiectasis is recognized where the ratio of the cross-sectional diameter of the bronchus to that of the homologous pulmonary artery is greater than one. When bronchial dilatation is marked, the cross-sectional appearance of the combined bronchus and artery resembles a signet ring. Minor discrepancies in the bronchoarterial diameter ratio may, however, be seen in normal individuals. In addition, many factors may cause transient or permanent changes in diameter of the relatively compliant pulmonary arteries. As a result, bronchial dilatation in isolation in the absence of bronchial wall thickening cannot always be regarded as diagnostic of bronchiectasis. When airways lie parallel to the plane of section, abnormal dilatation is recognized by a lack of normal tapering, producing a tramline appearance. Such airways may be visible in the lung periphery because of associated bronchial wall thickening. The visibility of a bronchus within 1 cm from the costal pleura and a bronchus abutting the mediastinal or paravertebral space are also findings of cylindrical bronchiectasis. Varicose bronchiectasis is characterized by a beaded appearance when it lies parallel to the scanning plane. It may assume a cylindrical or a cystic pattern when bronchi are running obliquely or perpendicular to the plane of section. Cystic bronchiectasis is seen as thin-walled cystic spaces that may contain fluid levels. Some topographic distribution of cystic lesions is suggestive of bronchiectasis, such as strings of cysts set in line from the hilum to the peripheral lung zones or clusters of cystic spaces grouped along a fissure or the mediastinum pleura. CT may readily show completely collapsed lobes or segments containing bronchiectatic airways. It may also show subtle degrees of volume loss of lung parenchyma on the association of crowding of mildly dilated airways and displacement of the fissure. Accumulation of secretions within bronchiectatic airways is generally easily recognizable as lobulated glove-finger, V or Y shaped densities. When orientated obliquely or perpendicular to the scan plane, filled ectatic bronchi are visualized as nodular or oval-shaped densities that can be followed on successive CT sections.

New words and expressions

varicose ['værikəus] *a*. 静脉曲张的
immunization [ˌimju:nai'zeiʃən] *n*. 免疫法
antibiotic [ˌæntibai'ɔtik] *a*. 抗生的，*n*. 抗生素
purulent ['pjuərulənt] *a*. 脓性的
sputum ['spju:təm] *n*. 唾液，痰
steroid ['stiərɔid] *n*. 类固醇
clubbing ['klʌbiŋ] *n*. 杵状指
excision [ek'siʒən] *n*. 切除术
mononuclear [ˌmɔnəu'nju:kliə] *a*. 单核的
pulmonary ['pʌlmənəri] *a*. 肺的
degeneration [diˌdʒenə'reiʃən] *n*. 变性，变质
pus [pʌs] *n*. 脓
ciliated ['silieitid] *a*. 具纤毛的
mucus ['mju:kəs] *n*. 粘液
epithelium [ˌepi'θi:liəm] *n*. 上皮
honeycombi ['hʌnikəum] *a*. 蜂窝的