·临床研究·

老年与青年空洞型肺结核CT征象比较

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【摘 要】 目的 分析老年组与青年组菌阳空洞型肺结核的CT特征,以提高对老年空洞型肺结核的认识。**方法** 回顾性分析2017年1月至2021年1月北京老年医院收治的经痰培养及病理检查确诊的42例老年空洞型肺结核(年龄≥60岁,老年组)和45例青年空洞型肺结核(年龄<45岁,青年组)患者的临床资料,比较2组患者的CT特征。采用SPSS 22.0统计软件进行数据分析。根据数据类型,采用χ^2检验进行组间比较。**结果** 老年组病变累及全肺叶、出现虫噬状空洞、小结节、实变或不张、肺内钙化灶、胸腔积液、纵隔淋巴结肿大及肺门淋巴结肿大的比例明显高于青年组[78.6%(33/42)和31.1%(14/45);42.9%(18/42)和20.0%(9/45);95.2%(40/42)和80.0%(36/45);47.6%(20/42)和24.4%(11/45);57.1%(24/42)和13.3%(6/45);33.3%(14/42)和13.3%(6/45);40.5%(17/42)和15.6%(7/45);28.6%(12/42)和2.2%(1/45)],差异均有统计学意义(均$P<0.05$);出现树芽征及粟粒影比例明显低于青年组[47.6%(20/42)和80.0%(36/45);2.4%(1/42)和17.8%(8/45)],差异均有统计学意义(均$P<0.05$)。**结论** 老年空洞型肺结核CT影像的特征性,对临床治疗、预后评价及防止耐药的发生起到积极指导作用。

【关键词】 老年人;肺结核;空洞;体层摄影术;X线计算机
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Comparative study on CT signs of cavitary pulmonary tuberculosis in the elderly and young

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【Abstract】 Objective To analyze the CT features of bacterial positive cavitary pulmonary tuberculosis in the elderly and young patients in order to improve the understanding of the disease in the elderly. **Methods** Clinical data of 42 elderly patients (≥60 years old, elderly group) and 45 young patients (<45 years old, youth group) with cavitary pulmonary tuberculosis identified with sputum culture and pathological results in our hospital from January 2017 to January 2021 were collected and analyzed retrospectively. The CT imaging signs were compared between the 2 groups. SPSS statistics 22.0 was used for data analysis. According to the data type, *Chi*-square test was employed for comparison between groups. **Results** The elderly group had significantly larger proportions of lesions involving the whole lung lobe, presence of insect phagocytic cavities, small nodules, consolidation or atelectasis, pulmonary calcification, pleural effusion, mediastinal lymphadenopathy and hilar lymphadenopathy when compared with the youth group [78.6% (33/42) *vs* 31.1% (14/45), 42.9% (18/42) *vs* 20.0% (9/45), 95.2% (40/42) *vs* 80.0% (36/45), 47.6% (20/42) *vs* 24.4%(11/45), 57.1% (24/42) *vs* 13.3% (6/45), 33.3% (14/42) *vs* 13.3% (6/45), 40.5% (17/42) *vs* 15.6% (7/45), 28.6% (12/42) *vs* 2.2% (1/45); all $P<0.05$]. There were obviously rarer tree bud sign and millet shadow in the elderly group than the youth group [47.6% (20/42) *vs* 80.0% (36/45), 2.4% (1/42) *vs* 17.8% (8/45); both $P<0.05$]. **Conclusion** The CT findings of senile cavitary pulmonary tuberculosis have certain characteristics, which play a positive guiding role in clinical treatment, prognosis evaluation and prevention of drug resistance.

【Key words】 aged; pulmonary tuberculosis; cavity; tomography; X-ray computed
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空洞型肺结核具有传染性强[1]、治疗难度高[2]及容易反复[3]等特点。老年患者因自身机体细胞免疫功能低下、肺功能降低等原因,形成空洞后不易闭合[4],若治疗方法不当,极易引起病情反复或迁延不愈,最终演变成耐药性肺结核[3],甚至危及患者生命。因此,对老年空洞型肺结核空洞及周围病变的观察和评价,对肺结核的治疗及预后具有重要意义。目前,国内外文献中关于老年空洞型肺结核影像的研究比较少见。本研究对老年和青年空洞型肺结核CT影像特征进行比较,旨在提高对老年空洞型肺结核的认识及治愈率,防止耐药及减少死亡。

1 对象与方法

1.1 研究对象

回顾性分析2017年1月至2021年1月北京老年医院收治的经痰培养及病理检查确诊的42例老年空洞型肺结核患者(年龄≥60岁,老年组)和45例青年空洞型肺结核患者(年龄<45岁,青年组)的临床资料。纳入的87例患者均符合《肺结核诊断WS288-2017》[5]的诊断标准,且CT影像均符合《肺结核影像诊断标准》[6]。老年组,男性34例,女性8例;年龄60~93(74.86±10.72)岁;临床症状以低热、咳嗽、咯血、厌食及身体消瘦等为主。青年组,男性31例,女性14例;年龄18~44(30.44±8.71)岁,临床症状以午后低热、咳嗽、咳痰等为主。纳入标准:(1)痰培养或病理学检查鉴定为结核分枝杆菌;(2)CT检查为肺结核伴空洞形成;(3)具有完整清晰的CT扫描影像资料。排除标准:(1)影像资料不全或模糊;(2)合并糖尿病或恶性肿瘤致患者免疫力明显下降。本研究通过北京老年医院医学伦理委员会批准。

1.2 方法

使用64排螺旋飞利浦Brilliance CT机(荷兰,飞利浦)对患者进行胸部螺旋CT平扫,扫描参数:管电压120 kV,管电流250 mA,层厚2 mm,层间距2 mm。患者均采取仰卧位,扫描范围从肺尖到肋膈角下缘。CT影像由1名放射科副主任医师和1名放射科主治医师独立阅片,双盲评审,结果不一致时经讨论后得出一致意见,如仍无法达成一致,则由影像科主任医师阅片并最终评定。

比较2组患者的CT影像征象,包括空洞类型、累及肺叶数量、树芽征、粟粒影、磨玻璃影、条索影、斑片影、支气管扩张、小结节、大结节、实变或不张、肺内钙化灶、胸腔积液、胸膜增厚、纵隔淋巴结肿大、肺门淋巴结肿大及纵隔淋巴结钙化等指标。

1.3 统计学处理

采用SPSS 22.0统计软件进行数据分析。计数资料以例数(百分率)表示,组间比较采用χ^2检验(理论频数≥5)或连续校正χ^2检验(1≤理论频数<5)。$P<0.05$为差异有统计学意义。

2 结 果

2.1 2组患者空洞类型比较

2组患者CT影像征象中虫噬状空洞情况比较,差异有统计学意义($P<0.05$),老年组虫噬状空洞明显高发。2组患者薄壁空洞、厚壁空洞、胸膜下空洞及非胸膜下空洞情况比较,差异均无统计学意义(均$P>0.05$;表1)。2组患者不同类型空洞CT图像详见图1。其中图1A:男性,61岁,右肺上叶干酪性肺炎内虫噬状孔洞;B:女性,68岁,右肺上叶后段胸膜下薄壁空洞;C:男性,75岁,左肺下叶胸膜下厚壁空洞,右肺下叶薄壁空洞;D:男性,81岁,左肺非胸膜下厚壁空洞;E:男性,22岁,左肺下叶干酪性肺炎内虫噬状孔洞,右肺上叶前段多发粟粒影;F:男性,23岁,左肺上叶胸膜下厚壁空洞,左肺上叶前段多发树芽征。

2.2 2组患者累及肺叶数量比较

2组患者病变累及全肺叶(5个肺叶)及2个肺叶情况比较,差异有统计学意义($P<0.05$);老年组病变累及5个肺叶多见,而青年组累及2个肺叶常见。2组患者病变累及1、3及4个肺叶情况比较,差异均无统计学意义(均$P>0.05$;表2)。

2.3 2组患者CT影像征象比较

老年组小结节、实变或不张、肺内钙化灶、胸腔积液、纵隔淋巴结肿大及肺门淋巴结肿大明显高发;青年组树芽征(图1F)、粟粒影(图1E)高发,差异均有统计学意义($P<0.05$)。2组患者影像征象中支气管扩张、大结节、磨玻璃影、条索影、斑片影、胸膜增厚及纵隔淋巴结钙化情况比较,差异无统计学意义($P>0.05$;表3)。

表1 2组患者不同类型空洞发生情况比较

Table 1 Comparison of occurrence of different types of cavities between two groups [n(%)]

Type of cavity	Elderly group (n=42)	Youth group (n=45)	χ^2	P value
Thin walled cavity	3(7.1)	7(15.6)	0.798	0.372
Thick walled cavity	35(83.3)	35(77.8)	0.426	0.514
Wormhole cavity	18(42.9)	9(20.0)	5.303	0.021
Subpleural cavity	16(38.1)	25(55.6)	2.658	0.103
Non-subpleural cavity	31(73.8)	32(71.1)	0.079	0.778

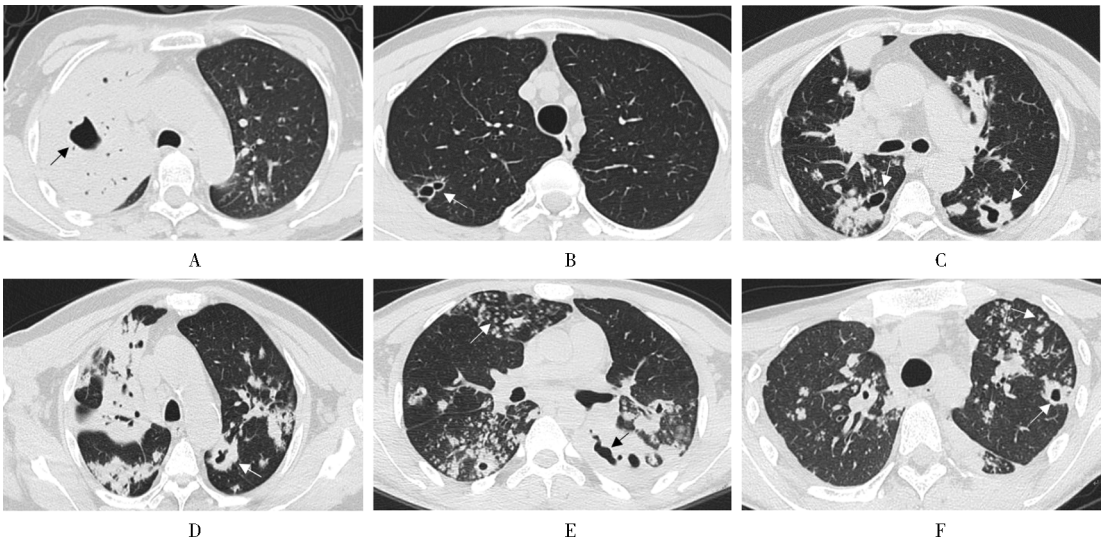


图 1 2 组患者不同类型空洞 CT 图像

Figure 1 CT images of different types of cavities in two groups

A: male, 61 years old, arrow indicates the wormhole in caseous pneumonia of upper lobe of right lung; B: female, 68 years old, arrow indicates the subpleural parenchymal cavity in posterior segment of upper lobe of right lung; C: male, 75 years old, arrow indicates the subpleural thick walled cavity in lower lobe of left lung and parenchymal cavity of lower lobe of right lung; D: male, 81 years old, arrow indicates the non-subpleural thick walled cavity of left lung; E: male, 22 years old, arrow indicates the wormhole in caseous pneumonia of lower left lung and multiple miliary shadows in the anterior segment of upper right lung; F: male, 23 years old, arrow indicates the subpleural thick walled cavity in upper lobe of left lung and multiple tree bud sign in anterior segment of upper lobe of left lung.

表 2 2 组患者累及肺叶数量比较

Table 2 Comparison of number of lung lobes involved between two groups [n(%)]

Number of lung lobes	Elderly group (n=42)	Youth group (n=45)	χ^2	P value
1	2(4.8)	2(4.4)	0.005	0.944
2	2(4.8)	11(24.4)	5.164	0.023
3	3(7.1)	10(22.2)	2.791	0.095
4	2(4.8)	8(17.8)	0.451	0.117
5	33(78.6)	14(31.1)	19.701	0.000

表 3 2 组患者 CT 影像征象比较

Table 3 Comparison of CT imaging signs between two groups [n(%)]

Item	Elderly group (n=42)	Youth group (n=45)	χ^2	P value
Bronchiectasia	27(64.3)	25(55.6)	0.689	0.407
Large nodule	26(61.9)	35(77.8)	2.612	0.106
Small nodule	40(95.2)	36(80.0)	4.567	0.033
Ground glass opacity	1(2.4)	4(8.9)	0.710	0.192
Consolidation or atelectasis	20(47.6)	11(24.4)	5.087	0.024
Strip rope shadow	34(81.0)	35(77.8)	0.133	0.715
Miliary shadow	1(2.4)	8(17.8)	4.017	0.045
Tree-in-bud	20(47.6)	36(80.0)	9.931	0.002
Patch shadow	32(76.2)	35(77.8)	0.031	0.860
Pulmonary calcification	24(57.1)	6(13.3)	18.455	0.000
Pleural effusion	14(33.3)	6(13.3)	4.908	0.027
Pleural thickening	17(40.5)	17(37.8)	0.066	0.797
Enlargement of thoracic mediastinal lymph nodes	17(40.5)	7(15.6)	6.754	0.009
Mediastinal lymph node calcification	5(11.9)	4(8.9)	0.213	0.644
Hilar lymphadenopathy	12(28.6)	1(2.2)	9.884	0.002

3 讨 论

本研究通过对老年空洞型肺结核与青年空洞型肺结核 CT 影像征象进行对照研究，发现老年空洞型肺结核患者病变累及全肺叶多见，影像征象中虫噬状空洞、多发小结节、实变或不张、肺内钙化灶、胸腔积液、纵隔淋巴结肿大及肺门淋巴结肿大等多形态病变显著高发。而青年空洞型肺结核患者影像征象中树芽征及粟粒影是其特征性表现。

本研究结果显示，老年空洞型肺结核肺内病变分布范围广，常累及全肺叶，且肺内病变形态多样，与张建年等[7]研究结果基本一致。空洞型肺结核干酪物质由空洞排出，经支气管引流，引流不畅易引起肺内广泛播散。老年人因器官及细胞功能退变、机体免疫功能低下、肺结构老化、肺防御功能变差，导致肺通气、换气功能不良，肺组织控制感染能力减低。因此老年人患空洞型肺结核后，空洞闭合困难，结核菌群更容易在气管内置留，引起肺内广泛播散。因空洞闭合缓慢及空洞迁延不愈，易引起肺内新老病灶同时存在，因此老年空洞型肺结核患者肺内病变常复杂多样，肺内钙化及小结节等多形态新老病灶同时存在。本研究发现老年空洞型肺结核肺内容易出现实变或不张等干酪性肺炎及虫噬状空洞，这与 Hunter 等[8]研究结果基本一致，肺结核虫噬状空

洞由肺内干酪样病变或结核球溶解而成,主要表现为肺内干酪样坏死病变内的无壁空洞,此病变主要发生在老年人及免疫力低下人群[9],老年人因机体免疫功能低下,患肺结核后支气管引流不畅及预后慢等原因,极易引起肺不张或实变等干酪性肺炎表现。由于肺结核浸润性等特征,干酪性肺炎内干酪样物质经引流支气管排出极易引起虫噬状空洞,因此老年肺结核患者肺内容易形成干酪性肺炎合并虫噬状空洞。

本研究发现青年空洞型肺结核患者影像征象中容易出现树芽征及粟粒影,树芽征和粟粒影均代表肺结核处于活动期[10,11]。青年肺结核患者树芽征高发,这与莫国友等[12]研究结果基本一致。树芽征为干酪样物质占据了终末细支气管和肺泡腔内病变形成的小结节影及分支细线影构成的酷似春天树枝发芽状的征象,是由于病变累及细支气管时,炎性渗出物和分泌物堵塞细支气管而形成,其病理表现为结核菌经气道播散而形成,表现为细支气管壁浸润增厚扩张,腔内充满干酪坏死样物质和小叶中心的干酪坏死及实变。因青年患者较老年人免疫力强,空洞排菌后,菌群活跃,菌群通过支气管可迅速到达支气管末端形成树芽征[13],树芽征多先出现在空洞所在肺叶,之后出现在其他肺叶。本研究中青年组空洞型肺结核肺内出现粟粒影情况较老年组高发,这与刘新忠[14]研究结果基本一致。粟粒影的形成主要分为两种,一种是肺内病灶或淋巴结干酪样坏死发生破溃时,大量菌群侵入血液,引起急性全身性病变;另一种是结核分枝杆菌沿支气管肺内播散所致,在肺内表现为多发点状高密度影。如果发生在老年患者则易引起急性呼吸窘迫综合征[15],治疗不规范极易导致患者死亡。

研究表明,老年与青年空洞型肺结核有许多共同征象,二者均以厚壁空洞为主,肺内容易合并支气管扩张,空洞周围及远处容易伴随出现斑片、条索及较大的腺泡结节影。

综上所述,老年空洞型肺结核空洞类型及空洞周围病变的影像征象具有一定的特征性,结合临床及实验室检查,能更好地提高对老年空洞型肺结核的认识,从而对临床治疗方案的拟定及预后的评估起到积极的指导作用。

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