

## 纵隔生殖细胞肿瘤 40 例的 CT 表现

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**摘要:**【目的】分析 40 例纵隔生殖细胞肿瘤的 CT 征象,提高其 CT 诊断准确性。【方法】回顾性分析 40 例病理证实的纵隔原发生殖细胞肿瘤的 CT 资料,24 例为畸胎瘤,16 例为非畸胎类生殖细胞肿瘤,40 例均行 CT 平扫和增强扫描,观察征象包括:发病部位,肿瘤大小,轮廓,边缘,平扫和增强扫描 CT 值,对于临近结构的侵犯,有无远处转移。【结果】40 例肿瘤均位于前纵隔,肿瘤的最大径为 5~16 cm;24 例畸胎瘤边界清楚,呈类圆形,CT 平扫 20 例可见脂肪密度影和钙化,增强扫描轻度强化,4 例呈均匀水样密度,肿瘤壁薄均匀,见弧线状钙化,增强扫描未见强化。16 例非畸胎类生殖细胞肿瘤分别呈分叶状,边界不清楚(11/16 例)或类圆形,边界清楚(5/16 例),13 例肿瘤平扫密度不均匀,内见稍高于水密度的低密度灶或斑点状钙化,增强扫描不均匀强化,3 例精原细胞瘤呈均匀密度,增强扫描均匀强化;分别有 6 例、6 例、10 例和 3 例非畸胎类生殖细胞肿瘤侵犯心包、胸膜、临近大血管和出现肺转移。【结论】纵隔生殖细胞肿瘤的常见 CT 征象为好发于前纵隔,肿瘤体积较大,畸胎瘤多数含有脂肪成分和钙化,CT 容易诊断。非畸胎类生殖细胞肿瘤多呈分叶状,边界不清楚,CT 平扫密度不均匀,增强扫描不均匀强化;精原细胞瘤可表现为均匀密度和均匀强化。非畸胎类生殖细胞肿瘤可侵犯心包、胸膜和临近大血管,并出现其他器官转移;诊断应当与胸腺瘤和淋巴瘤相鉴别。

**关键词:** 原发纵隔肿瘤;生殖细胞肿瘤;计算机成像

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### CT Findings of Germ Cell Tumors of Mediastinum: A Report of 40 Cases

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**Abstract:** 【Objective】To analyze computed tomography (CT) features of germ cell tumors of the mediastinum and to improve the diagnostic efficacy of CT for such tumor. 【Methods】Forty patients with primary germ cell tumors of the mediastinum, and proven pathologically, were enrolled. All patients, including 24 patients with teratoma and 16 patients with non-teratomatous germ cell tumor, underwent non-enhanced and contrast-enhanced CT examinations. The CT features, including location, size, shape, edge, CT attenuation, involvement of adjacent structure and local or distant metastasis of each lesion were retrospectively analyzed.【Results】All the masses arose within the anterior mediastinum and their maximal diameter ranged from 5 cm to 16 cm (mean, 11 cm). 24 masses of patients with teratoma appeared rounded or oval and well-circumscribed, 20 of which revealed fat and calcification on non-enhanced CT images and showed light enhancement after contrast administration, the rest four masses revealed homogeneous water attenuation, and the capsule wall was thin and uniform with vaulted calcification on it. 11 and 5 masses of patients with non-teratomatous germ cell tumor appeared lobulated, ill-circumscribed and rounded or oval and well-circumscribed, respectively. 13 masses revealed heterogeneous attenuation on non-enhanced CT images with patchy low-attenuation foci whose attenuation is lightly larger than that of water and stippled calcification, and showed moderately heterogeneous enhancement after contrast administration. 3 masses of patients with seminoma revealed homogeneous attenuation and homogeneous enhancement after contrast administration. 6, 6, 10, and 3 cases of non-teratomatous germ cell tumor showed pericardial effusion, pleural effusion, involvement of adjacent vascular structures and pulmonary metastasis, respectively. 【Conclusions】The characteristic CT findings of mediastinal germ cell

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tumors reveal bulky masses in the anterior mediastinum. CT diagnosis for teratomas is easy because of the fat and calcification in the tumors. Most of non-teratomatous germ cell tumors show ill-circumscribed, lobulated masses, heterogeneous attenuation on non-enhanced CT images and heterogeneous enhancement after contrast administration. Seminomas may show homogeneous attenuation and homogeneous enhancement after contrast administration. The non-teratomatous germ cell tumor is apt to involve pericardium, pleura and adjacent vascular structure and develop distant metastasis. The differential diagnosis between non-teratomatous germ cell tumor and thymoma, lymphoma is needed.

**Key words:** primary; mediastinal neoplasm; germ cell tumor; computed tomography

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原发于纵隔的生殖细胞肿瘤比较少见,病理类型包括畸胎瘤、精原细胞瘤、胚胎癌、内胚窦瘤、绒毛膜细胞癌以及混合型生殖细胞肿瘤,其中畸胎瘤相对多见,而其他非畸胎类生殖细胞肿瘤则比较罕见,以往关于该类肿瘤CT表现的文献多为个案报道<sup>[1-4]</sup>,术前正确诊断比较困难。本研究回顾性分析40例病理证实的纵隔生殖细胞肿瘤,总结其特征性CT征象,以期提高对该类肿瘤的认识。

## 1 材料与方法

### 1.1 病例资料

搜集中山大学肿瘤防治中心2006年1月至2010年6月间经病理证实的纵隔原发的生殖细胞肿瘤患者40例,男性35例,女性5例,年龄15至44岁,平均年龄22岁,临床主要表现为胸痛,咳嗽和呼吸困难。

### 1.2 检查方法

40例患者均行CT平扫和增强扫描。CT扫描采用16排螺旋CT机(Philips Medical Systems, Best, The Netherlands),扫描条件为120 kV、200 mA,扫描层面从锁骨上窝至膈顶水平,层厚5 mm,层间距2 mm。增强扫描采用非离子型对比剂优维显(Ultravist, Schering)静脉团注,注射速率2.5 mL/s,注射对比剂后60 s行增强扫描。

### 1.3 图像分析

由经验丰富的影像科医师阅片,分析肿瘤的部位、形态、边缘、大小、平扫和增强扫描的密度,对邻近组织结构的推压、侵犯及有无远处转移。平扫CT值测量取肿瘤最大层面,避开肉眼可见的坏死和钙化,避开肿瘤边缘部位,增强扫描CT值测量取平扫对应的层面,选取和平扫同样大小的兴趣区,以前胸壁肌肉增强扫描强化程度作为参考,将肿瘤的增强扫描强化程度分为轻度、中度和明

显强化。

### 1.4 手术与病理学检查

30例患者手术完整切除肿瘤,10例患者肿瘤巨大与周围组织粘连,无法完整切除,经前胸壁细针穿刺组织行病理检查,所有组织标本均由经验丰富的病理科医师观察。

## 2 结果

### 2.1 肿瘤的发生部位和大小

40例肿瘤均为单发,位于前纵隔。肿瘤最大径为5~16 cm,平均11 cm。

### 2.2 肿瘤的CT征象

病理检查证实24例为畸胎瘤,肿瘤边界清楚,呈类圆形,其中20例CT平扫可见脂肪密度影和钙化灶,增强扫描轻度强化(图1A,B),4例呈均匀水样密度,肿瘤壁薄,均匀,内见弧线状钙化,增强扫描未见强化。16例为非畸胎类生殖细胞肿瘤(包括7例精原细胞瘤,6例混合型生殖细胞瘤,2例内胚窦瘤,1例绒毛膜细胞癌)。其中11例形态不规则,呈分叶状,边界不清;5例呈类圆形,边界清楚。13例CT平扫密度不均匀,病灶内见片状稍高于水样密度的低密度灶和斑点状钙化,增强扫描轻度至中度不均匀强化(图2A,B),该13

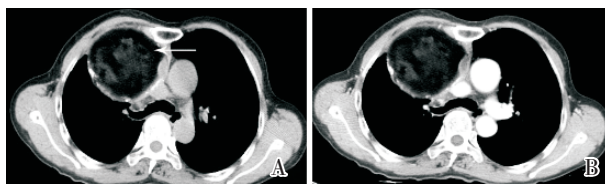


图1 纵隔畸胎瘤

Fig.1 Teratoma of mediastinum

Male patient of 26 years old. A showed that a mass arose within the right anterior mediastinum with heterogeneous attenuation on non-enhanced CT scan, presenting adipic attenuation (white arrow) and speckled and vaulted calcification on the capsule wall. B showed lightly heterogeneous enhancement after contrast administration of the mass.



图 2 纵隔原发的混合型生殖细胞瘤

Fig.2 Primary mediastinal mixed germ cell tumor

Male patient of 41 years old. A showed that a mass arose within the anterior mediastinum with heterogeneous attenuation on non-enhanced CT scan, presenting patchy low attenuation and speckled calcification. B showed mild heterogeneous enhancement of the mass. C showed a small quantity of pericardial effusion in the ventricular level (white arrow).

例肿瘤实性部分的平扫 CT 值为 24 ~ 49 HU, 平均 32 HU, 增强扫描其 CT 值为 46 ~ 92 HU, 平均 72 HU, 与前胸壁肌肉相比, 呈中度至明显强化。余 3 例平扫密度均匀, 增强扫描均匀强化, 3 例均为精原细胞瘤(图 3A, B)。

犯心包出现心包积液 (图 2C), 6 例侵犯胸膜出现胸腔积液(图 4); 10 例推压、包绕甚至侵犯纵隔大血管, 使其管腔狭窄, 管壁不光整(图 5A); 3 例出现肺转移, 表现为双肺多发结节 (图 5B, C)。

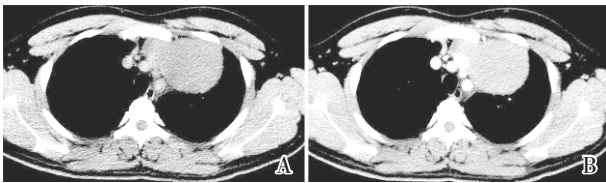


图 3 纵隔原发的精原细胞瘤

Fig.3 Primary mediastinal seminoma

Male patient of 22 years old. A showed that a mass arose within the left anterior mediastinum showing homogeneous attenuation on non-enhanced CT scan; B showed homogeneous enhancement after contrast administration of the mass.

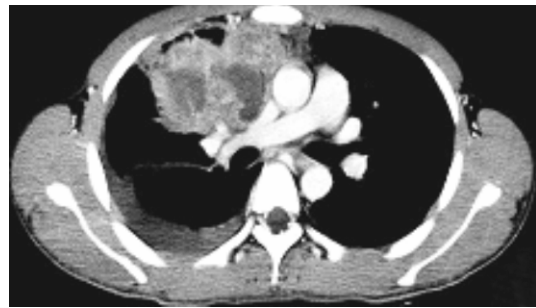


图 4 纵隔原发的混合型生殖细胞瘤

Fig.4 Primary mediastinal mixed germ cell tumor

Male patient of 16 years old, a mass arose within the right anterior mediastinum with heterogeneous enhancement after contrast administration and a small quantity of pleural effusion in the ipsilateral thoracic cavity.

### 2.3 肿瘤的局部侵犯和远处转移

16 例非畸胎类生殖细胞肿瘤中, 有 6 例侵

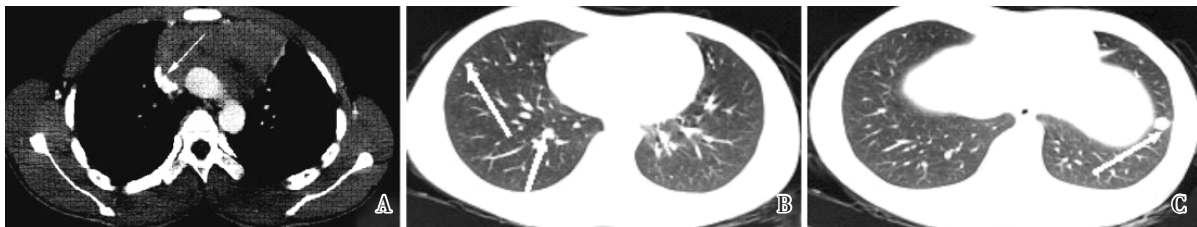


图 5 纵隔原发的精原细胞瘤

Fig.5 Primary mediastinal seminoma

Male patient of 15 years old. A showed that a mass arose within the anterior superior mediastinum and obviously compressed the superior vena cava, which showed flattening and coarse of the vessel wall (white arrow). B and C showed multiple nodules in the bilateral lung field (white arrow).

### 3 讨论

原发于纵隔的生殖细胞肿瘤占有生殖细胞肿瘤的2%~5%,占全部纵隔肿瘤的11%<sup>[5]</sup>,文献报道纵隔生殖细胞肿瘤好发于青年男性,肿块发现时通常较大,临床症状无特殊<sup>[6-8]</sup>。本组病例绝大多数为男性患者(35/40,86%),平均年龄22岁,除部分患者表现为胸痛、咳嗽和呼吸困难,余患者临床无任何不适,与文献报道相符。

纵隔生殖细胞肿瘤的病理类型包括畸胎瘤、精原细胞瘤、胚胎癌、内胚窦瘤、绒毛膜细胞癌以及混合型生殖细胞肿瘤<sup>[6,9]</sup>。畸胎瘤相对多见,占纵隔生殖细胞肿瘤的75%以上<sup>[10]</sup>,有良恶性之分,本组24例畸胎瘤均为良性。非畸胎类的生殖细胞肿瘤则均为恶性,临床及其罕见。

本组40例肿瘤均为单发,位于前纵隔,文献报道的纵隔生殖细胞肿瘤也是以前纵隔起源居多<sup>[11-13]</sup>,因此,我们认为前纵隔应视为纵隔生殖细胞肿瘤的好发部位。

本组所有肿瘤的最大径均大于5cm,最大者达16cm,24例畸胎瘤均呈类圆形,边界清楚,符合其良性生物学特征。大多数非畸胎类生殖细胞肿瘤形态不规则,呈分叶状,边界不清(11/16,69%)。Sekine<sup>[9]</sup>、Schwabe<sup>[14]</sup>、Sada<sup>[15]</sup>等分别报道1例纵隔非畸胎类的生殖细胞肿瘤,其最大径大于5cm,呈分叶状外观,我们分析是由于非畸胎类的生殖细胞肿瘤为恶性,生长迅速,且肿瘤组织生长不均衡所致。

大多数畸胎瘤由于其成分特殊,内含脂肪和钙化,CT扫描容易诊断<sup>[6-7]</sup>。本组24例畸胎瘤,其中20例病灶内见脂肪密度影和钙化灶,术前均正确诊断。4例畸胎瘤呈均匀水样密度,需与支气管囊肿和淋巴管瘤相鉴别,支气管囊肿发病部位特殊,位于气管、主支气管和肺门大支气管附近;而淋巴管瘤可发生于前纵隔,但其典型表现为薄壁单房囊性肿块,钙化极其罕见,可与畸胎瘤相鉴别。

非畸胎类的生殖细胞肿瘤CT平扫多表现为密度不均匀,病灶内见片状密度稍高于水的低密度影和钙化灶,增强扫描轻度至中度不均匀强化<sup>[16-18]</sup>。本组13例(13/16,81%)非畸胎类生殖细胞肿瘤CT表现符合此特征,病理证实肿瘤内

片状低密度影为坏死,我们分析其原因可能是肿瘤生长快,体积大,部分肿瘤血供不足所致。该类生殖细胞肿瘤需要与发生在前纵隔的胸腺瘤,尤其是侵袭性胸腺瘤相鉴别,两者鉴别需结合临床,胸腺瘤发病年龄较大,一般在40岁以上,患者多表现为重症肌无力,而生殖细胞肿瘤多见于青年男性,临床症状无特殊。本组只有3例(3/7,43%)精原细胞瘤平扫密度均匀,增强扫描均匀强化,与文献报道的大部分精原细胞瘤CT平扫密度均匀,增强扫描均匀强化不太一致<sup>[1,16-17]</sup>,我们认为与本组精原细胞瘤病例数太少有关。该3例精原细胞瘤术前诊断需与淋巴瘤鉴别,部分淋巴瘤也可表现为前纵隔肿块,密度均匀,增强扫描均匀强化,但淋巴瘤质地柔软,常包绕但不侵犯前纵隔血管,多合并其他部位淋巴结肿大,两者可资鉴别。

本组16例非畸胎类的生殖细胞肿瘤中,6例侵犯心包出现心包积液,6例侵犯胸膜表现为胸腔积液,10例推压、包绕甚至侵犯纵隔大血管使其管腔狭窄,管壁毛糙不光整,3例出现肺转移,表现为双肺多发结节;文献报道纵隔非畸胎类生殖细胞肿瘤可转移至肺、肝、骨、纵隔及腹膜后淋巴结等<sup>[18]</sup>。上述表现充分体现了纵隔非畸胎类生殖细胞肿瘤的恶性生物学行为。

综上所述,纵隔生殖细胞肿瘤的常见CT征象为好发于前纵隔,肿瘤体积大,畸胎瘤多呈类圆形,边界清楚,由于其成分特殊,内含脂肪成分和钙化,CT容易诊断。非畸胎类生殖细胞肿瘤多呈分叶状,边界不清楚,CT平扫密度不均匀,增强扫描不均匀强化;精原细胞瘤可表现为均匀密度,增强均匀强化。非畸胎类生殖细胞肿瘤可侵犯心包、胸膜和临近大血管,并出现肺等其他器官的转移;诊断应当与胸腺瘤和淋巴瘤相鉴别。

本组16例非畸胎类生殖细胞肿瘤,包括7例精原细胞瘤,6例混合型生殖细胞瘤,2例内胚窦瘤和1例绒毛膜细胞癌,除3例精原细胞瘤CT平扫表现为均匀密度,增强扫描均匀强化外,余13例肿瘤平扫均表现为不均匀密度,内见片状坏死和钙化,增强扫描不均匀强化。但因为该4种病理类型的病例样本数太小(7例精原细胞瘤,6例混合型生殖细胞瘤,2例内胚窦瘤和1例绒毛膜细胞癌),关于其实性部分平扫和增强扫描CT值变化的差异,无法进行统计学分析,故对于本组各类非畸胎类生殖细胞肿瘤,仅凭CT征象无法鉴别诊

断,最终确诊需依赖病理学检查。

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