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# 经胸超声胸骨右缘切面对 Stanford A 型主动脉夹层诊断价值的研究

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**摘要 目的:**通过经胸超声心动图获取胸骨右缘升主动脉长短轴切面观察 Stanford A 型主动脉夹层患者的升主动脉结构,探讨对该类患者进行检查时该切面的应用价值。**方法:**31 例经 CTA 或手术证实为 A 型主动脉夹层的连续性患者,超声心动图检查除常规通过胸骨左缘切面观察升主动脉结构外,均做胸骨右缘切面以进一步观察升主动脉结构,包括最大内径,有无撕脱内膜及内膜活动情况,同时应用常规胸骨左缘切面和胸骨右缘切面对 A 型主动脉夹层能够清晰显示出的病例比例加以比较。**结果:**胸骨左缘切面能够清晰显示升主动脉结构 9 例,占比例 29%。胸骨右缘切面能够清晰显示升主动脉结构 20 例,比例 65%。将两种切面结合能够清晰显示升主动脉结构的比例升高到 74%。胸骨右缘肋间切面测得的升主动脉最大径线数值与 CTA 结果的一致性更好。**结论:**胸骨右缘肋间切面对 A 型主动脉夹层显示的清晰度更好,有助于临床诊断,具有重要的参考价值,值得临床广泛推广。

**关键词:**经胸超声心动图;胸骨右缘切面;Stanford A 型主动脉夹层

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## Diagnostic Value of the Right Parasternal Window of Transthoracic Echocardiography in the Diagnosis of Stanford A Aortic Dissection

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**ABSTRACT Objective:** We observed ascending aorta structure in patients with Stanford A aortic dissection by using transthoracic echocardiography to obtain the long and short axis of the right parasternal intercostal window. The purpose of this study is to explore the application value of this echocardiographic window in this type of patients. **Methods:** The ascending aorta of 31 successive patients with type A aortic dissection confirmed by CTA or surgery was observed by the echocardiographic left parasternal window and right parasternal window, including the maximal inner diameter, the avulsion and activity of the intima. The proportion which could clearly displayed struture of ascending aorta in this two windows was compared. **Results:** The left parasternal window clearly displayed the structure of the ascending aorta in 9 cases, with a proportion of 29%. The right parasternal window clearly displayed the ascending aorta structure in 20 cases, with a proportion of 65%. The proportion of combining two kinds of windows increased to 74%. The maximum diameter of ascending aorta measured by the right parasternal window is more consistent with that of CTA. **Conclusion:** The right parasternal intercostal window has great significance in diagnosing type A aortic dissection and deserved be widely popularized.

**Key words:** Transthoracic echocardiography; Right parasternal window; Stanford A aortic dissection

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### 前言

上世纪八十年代,国外学者报道了超声心动图经胸骨右缘透声窗诊断心血管畸形及主动脉瘤的有关方法,但在国内未得到广泛重视和应用<sup>[1-4]</sup>,近年来又有文献报道将此切面应用于提高主动脉瓣狭窄患者瓣口血流速度测量的准确性<sup>[5-6]</sup>,但将此切面应用于主动脉夹层的诊断于国内外仅见少量报道<sup>[7-11]</sup>,而评

估该切面在连续性主动脉夹层患者诊断中的应用价值于国内外并未见报道。本文旨在通过胸骨右缘切面观察 Stanford A 型主动脉夹层患者,并与传统的胸骨左缘切面进行对比,探讨该切面对此类患者的临床应用价值。

### 1 资料与方法

#### 1.1 临床资料

自 2014 年 9 月至 2018 年 1 月经 CTA 或手术证实的 Stanford A 型主动脉夹层患者 31 例,年龄 48-72 岁,平均 57 岁,其中男性 23 例,女性 8 例。夹层的分型方法为 Stanford 分

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型的细化分型方法<sup>[12]</sup>。

## 1.2 仪器与方法

使用迈瑞 DC-6 Expert 超声诊断仪, 探头频率 2-4Mhz, 患者均为床旁操作, 所有患者取平卧位, 均努力采集胸骨左缘及右缘肋间 (第 2-3 及 3-4 肋间) 切面的升主动脉长轴及短轴图像, 并测量动脉短轴方向最大径线 (均测量主动脉前缘至前缘之间的距离), 并观察有无撕脱内膜及其位置和形态及活动情况。再根据患者具体情况, 经临床医生同意后对部分图像质量欠佳的患者取左侧或右侧卧位再次采集图像。全部患者均于距超声检查一天内行增强 CTA 检查, CTA 测量升主动脉最大径

线时采用轴向参数多平面重建的短轴图像, 测量主动脉内缘至内缘之间的距离<sup>[13,14]</sup>。

## 2 结果

### 2.1 两种切面结合的清晰度显示

胸骨左缘肋间切面中能够清晰显示包括撕脱内膜片在内的升主动脉结构的病例为 9 例, 占比例 29%。胸骨右缘肋间切面能够清晰显示包括撕脱内膜片在内的升主动脉结构的病例有 20 例, 占比例 65%。将两种切面结合能够清晰显示升主动脉及撕脱内膜片结构的比例升高到 74%。

表 1 两种切面中能够清晰显示 Stanford A 型主动脉夹层升主动脉结构的例数及比例

Table 1 The number and proportion of ascending aorta in Stanford A type aortic dissection which can be clearly displayed in two windows

| Total number of cases    |                       | Left parasternal window |                       |     |
|--------------------------|-----------------------|-------------------------|-----------------------|-----|
| 31                       |                       |                         |                       |     |
|                          |                       | Clearly displayed       | Not clearly displayed |     |
| Right parasternal window | Clearly displayed     | 6                       | 14                    | 65% |
|                          | Not clearly displayed | 3                       | 8                     | 35% |
|                          |                       | 29%                     | 71%                   |     |

### 2.2 与传统的胸骨左缘切面进行对比

将胸骨左缘肋间切面测量所得的升主动脉短轴最大径线和胸骨右缘切面测得的数值与 CTA 结果相比较, 发现胸骨右

缘切面测得数值与 CTA 结果的一致性更好, 更能够代表升主动脉扩张的实际程度。

表 2 两种切面测量升主动脉最大径与 CTA 测值比较(单位 mm)

Table 2 Comparison of the maximum diameter of ascending aorta measured by CTA and two kinds of windows (unit: mm)

| The maximum diameter of ascending aorta measured by CTA | The maximum diameter of ascending aorta measured by left parasternal window | The maximum diameter of ascending aorta measured by right parasternal window |
|---------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 55± 7                                                   | 48± 6                                                                       | 54± 8                                                                        |

## 3 讨论

急性主动脉夹层是临床急重症, 临床表现为急性胸痛可危及生命, 应迅速明确诊断以便及时抢救。根据主动脉夹层的 Stanford 分型<sup>[12-14]</sup>, 累及升主动脉者为 A 型, 仅累及降主动脉为 B 型。和 B 型相比 A 型患者病情更重发展更快, 预后较差。所以早期准确的诊断出 A 型夹层和细致评估其病变特点对于及早确定治疗方案挽救患者生命具有极重要的意义。增强 CTA 检查对于 A 型夹层是公认最有效的检查手段, 然而 CTA 有时无法做到立即检查, 也做不到无创和连续动态的观察, 尤其对于生命体征不平稳无法移出监护室的患者, 往往需要依靠超声检查才能明确诊断。和经胸超声相比经食道超声能够获取升主动脉中下段的高质量影像, 但是由于其为侵入性检查导致了临床实际应用受到极大限制<sup>[15]</sup>。而经胸超声心动图既可以在床旁即对怀疑夹层的患者进行迅速和无创的检查也可以反复操作, 几乎没有任何检查风险。除了应用于传统的术前筛查瓣膜、冠状动脉、心包等病变的临床需求外, 也可以应用于确定夹层是否存在, 测量内径, 评价撕脱内膜及真假腔形态等情形。但是传统的经胸超声检查声窗位于胸骨左缘肋间, 由于肺气和胸骨常常影响该位置对升主动脉中远段的显示, 所以该声窗仅对于主

动脉根部和升主动脉近端显像较好, 对于撕脱内膜形态复杂或位置较高的患者显示尤其不理想; 而且由于该声窗往往只能采集到长轴切面, 经常导致不能清晰显示撕脱内膜, 更无法显示主动脉水平面的真假腔形态。

文献报道证实, 胸骨右缘切面能为大约 1/3 的健康成年人提供满意的超声影像<sup>[16]</sup>, 而对于 A 型夹层患者, 由于升主动脉明显增宽和右移, 故也应能够在更大比例患者中获取满意图像。根据国内一些报道<sup>[7,11]</sup>, 对主动脉扩张的患者胸骨右缘切面能够提供很多额外信息, 但是其能清晰显示的病例比例仍有一定争议。本研究结果证实胸骨右缘切面能够在大多数 A 型夹层患者中显示主动脉长短轴全貌, 且由于此处升主动脉结构更靠近胸壁位于图像近场的缘故, 图像非常清晰, 对于显示真假腔及撕脱内膜水平面形态等方面在大多数情况下优于左侧声窗, 在大幅度提高传统声窗夹层显示率的同时还能有效避免由于主动脉前壁伪像干扰导致的误诊。而左右侧两种声窗结合后可以将经胸心脏超声技术诊断升主动脉夹层的优越性提高到最大程度。但本研究结果与之前国内薛超等的研究结果并不完全一致, 该结果得出右缘结合左缘切面可以清晰显示升主动脉夹层的比例高达 100%<sup>[11]</sup>, 考虑其原因应为本研究样本采用连续性而非选择性患者, 必然会遇到一些肺气较重、肋间隙较窄

及病情较重无法行侧卧位检查的患者,导致无法获取清晰的胸骨右缘图像,但这并不妨碍本研究得出该切面有较大临床意义的结论。

本研究还发现由于胸骨左缘切面往往只能获取升主动脉长轴图像,而扩张的血管又常常呈椭圆形,这就使得测量动脉内径时难以获得垂直于长轴的标准水平面的最大径线,故其测值常与 CTA 不相符,往往有较大幅度的低估<sup>[13,14]</sup>。本研究显示右缘短轴切面获取的径线与左缘径线相比和 CTA 结果更为一致,这应是由于升主动脉近中段空间结构上更加垂直和接近于肋间隙,使得超声获取的短轴切面更加垂直于动脉长轴的缘故。因此常规使用右缘切面测量升主动脉内径不仅能够更准确的评估夹层患者升主动脉扩张的程度,还可以对单纯升主动脉扩张的患者也做到精确评估,提高此技术在随访观察该类患者的意义。

在日常临床工作中对急性胸痛患者检查时,急诊床旁超声在提示诊断及治疗方向上往往起到至关重要的作用,本研究结果提示对怀疑主动脉夹层的患者,如果常规界面不能获取足够信息,增加其他非常规切面扫描有极其重要的意义,既往文献曾报道脊柱旁切面可以提高降主动脉夹层的显示率<sup>[17,18]</sup>,如果再结合胸骨左右缘及主动脉弓切面就可以最大程度获取主动脉全程的结构信息,有助于为临床提供诊疗依据。

#### 4 结论

胸骨右缘切面是从全新的角度来观察升主动脉结构,可以进一步提高经胸超声对 A 型夹层的检出率及提供更丰富的结构信息,提升超声在监护室中的地位。更精确的最大径线测量值也能为夹层及升主动脉瘤患者提供更准确的随访及干预依据<sup>[19]</sup>。在未来如能将右缘切面结合已被证实可提高夹层诊断准确性的超声造影技术则将会在急诊床旁的夹层诊断中起到更大的作用<sup>[20]</sup>。

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