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术前病程对青少年特发性脊柱侧凸手术和术后生存质量的影响

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[摘要] **目的** 探讨术前病程对青少年特发性脊柱侧凸(adolescent idiopathic scoliosis, AIS)矫形手术及患者术后生存质量的影响。**方法** 行单纯后路矫形、全椎弓根内固定的 AIS 患者, 根据术前病程分为 2 组: S 组(术前病程 < 2 年)和 L 组(术前病程 ≥ 2 年)。两组患者以性别比相同、Lenke 分型相同、主弯 Cobb 角相似进行匹配, 每组均有 55 例入选。将两组患者术前、术后及随访时的各种放射学参数进行对比, 比较两组融合椎体数、术中失血量、SRS-22 量表得分等指标。**结果** 两组患者术前主侧凸 Cobb 角相似, S 组主侧凸柔韧性大于 L 组 ($P=0.034$)。S 组术前次侧凸 Cobb 角小于 L 组 ($P=0.035$)。术后两组冠状面及矢状面放射学参数相似, 术中失血及输血量无统计学差异。L 组融合椎体数多于 S 组 ($P=0.027$)。随访时两组 SRS-22 量表中功能/活动度、疼痛、自我形象/外观及精神健康得分无统计学差异, S 组治疗满意度维度得分高于 L 组 ($P=0.037$)。**结论** 脊柱侧凸的柔韧性会随着病程延长而降低, 病程可能是次侧凸进展的危险因素, 对 AIS 患者术后生存质量存在影响。

[关键词] 青少年特发性脊柱侧凸; 病程; 外科手术; 生存质量

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Influence of pre-operative disease course on operation and post-operative quality of life in adolescents with idiopathic scoliosis

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[Abstract] **Objective** To study the influence of pre-operative disease course on the operation and post-operation quality of life of adolescents with idiopathic scoliosis (AIS). **Methods** A total of 110 AIS patients who were treated with classic posterior correction, pedicle internal fixation were divided into two groups according to their disease courses ($n=55$): short course group with a pre-operation course < 2 years (S group), long course group with a pre-operation course ≥ 2 years (L group). The gender, Lenke type, and major curve Cobb angle were matchable between the two groups. Various radiographic measurements and indices like fusion level, intraoperative blood loss and scores of SRS-22 scale were compared between the two groups before operation, immediately, and 2 years after operation. **Results** The pre-operative Cobb angles of the major curve were similar between the two groups, but the flexibility of the major curve averaged $(55.7 \pm 18.77)\%$ in the S group and $(48.1 \pm 18.24)\%$ in the L group ($P=0.034$). Pre-operative Cobb angles of the minor curve were larger in L group than those in S group ($[30.1 \pm 12.10]^\circ$ in the S group and $[34.8 \pm 10.85]^\circ$ in the L group, $P=0.035$). The post-operative radiographic measurements and the blood loss/infusion were similar between the two groups. The number of fused vertebrae in the L group was significantly more than that in the S group ($P=0.027$). The parameters in the SRS-22 scale, including function/activity, pain, self-image/appearance, and mental health were similar between the two groups during follow-up. And the L group had a significantly lower satisfaction rate of treatment compared with the S group ($[4.0 \pm 0.70]$ vs $[3.7 \pm 0.78]$, $P=0.037$). **Conclusion** The flexibility of the curve in AIS decreases with the increase of disease course, and the disease course might be a risk factor for the scoliosis progression of the minor side. Patients with a disease course ≥ 2 years have more fused vertebrae than those with a disease course < 2 years. The length of pre-operative disease course has influence on the quality of life of AIS patients after operation.

[Key words] adolescent idiopathic scoliosis; course of disease; operative surgical procedures; quality of life

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青少年特发性脊柱侧凸(adolescent idiopathic scoliosis, AIS)起病隐匿,发病年龄不定,许多患者都是因为身体出现畸形(如双肩不平、剃刀背畸形、腰部不对称等)而至医院首次就诊,在脊柱侧凸普查制度不完善的发展中国家,这种情况更加普遍。AIS患者主要包括手术治疗、支具治疗及随访观察3种治疗方式。支具治疗的AIS患者中约20%~24%最终仍需手术,随访观察治疗的患者也有13%最终需要手术^[1]。AIS进展的危险因素包括Cobb角大小、Risser征、侧凸类型等,其进展速度差异较大。进展速度不同导致手术治疗患者的术前病程存在着较大的差异。因此,本研究分析2003—2006年本院收治的AIS患者的临床资料,探讨术前病程对AIS矫形手术及患者术后生存质量的影响。

1 资料和方法

1.1 入选标准及基线资料

选择2003年至2006年在本院行单纯后路矫形融合、全椎弓根螺钉内固定的AIS患者。入选标准:(1)随访时间大于2年;(2)随访资料完整;(3)所有患者因身体出现畸形而首次就诊,排除因体检或偶然发现(如拍胸片)而就诊者。根据其术前病程长短分为两组:术前病程<2年组(S组)和术前病程≥2年组(L组)。为了控制混杂因素的干扰,两组入选患者以性别比相同、Lenke分型^[2]相同、主弯Cobb角相似(相差小于5°)进行匹配设计。符合上述标准的入选病例每组各有55例。

两组AIS患者中女性均49例,男性均6例。Lenke 1型32例(58%),Lenke 2型1例(2%),Lenke 3型5例(9%),Lenke 4型1例(2%),Lenke 5型14例(25%),Lenke 6型2例(4%)。S组手术时平均年龄(14.9±1.81)岁(11.3~17.7岁),平均随访时间(3.5±1.12)年(2.0~5.5年),平均病程为(7.8±6.91)个月(0.2~20.0个月),手术时平均Risser征为(3.1±1.44)°(0°~5°),10例(18.2%)患者术前进行过支具治疗。L组手术时平均年龄(15.4±1.77)岁(11.4~18.0岁),平均随访时间(3.3±1.15)年(2.0~5.5年),平均病程为(46.3±29.88)个月(24.0~180.0个月),手术时平均Risser征为(3.6±1.20)°(0°~5°),26例(47.3%)患者术前进行过支具治疗。两组患者术前病程、术前进行支具治疗的例数差异有统计学意义($P<0.0001$)。

1.2 手术操作和术后处理

全部患者均采用后入路,全部椎弓根螺钉的置入均采用徒手技术(Free Hand)^[3],内固定器械包括Moss-Miami、CDH以及XIA。使用自体骨和(或)Osteoset人工骨(Wright

公司)材料混合进行植骨融合。术中行SSEP(somatosensory evoked potentials)监测,术毕行唤醒试验。术后3d下床活动,术后3个月内佩戴保护性支具。所有患者术后未发生假关节形成、断棒及翻修手术等。

1.3 影像学数据测量

影像学资料包括手术前站立位全脊柱正侧位、左右弯曲位X线片,术后及随访时站立位全脊柱正侧位X线片,且由同一骨科医生对影像学数据进行测量。影像学数据测量及分析包括手术前、术后3d及术后随访大于2年时的主侧凸及次侧凸Cobb角。通过术前左右弯曲位X线片测量计算侧弯柔韧度。侧位片测量胸椎后凸角(T₅~T₁₂)以及腰椎前凸角(L₁~S₁)。

1.4 融合椎体数、术中失血量及输血量、SRS-22量表填写

比较两组融合椎体数、下融合椎与下终椎差值。同时比较术中失血量及总输血量。末次随访时,要求患者填写SRS-22量表^[4]。比较两组间SRS-22量表各维度得分。

1.5 统计学处理

采用SPSS 11.0统计软件,通过 t 检验对两组患者手术前后各参数进行统计学检验,检验水平(α)为0.05。

2 结果

2.1 冠状位影像学测量结果

结果(表1)表明:术前两组主侧凸Cobb角度差异无统计学意义;S组主侧凸柔韧性[(55.7±18.77)%]大于L组[(48.1±18.24)%, $P=0.034$]。术后即刻两组主侧凸矫正率相似[(72.6±9.88)% vs (70.1±10.19)%, $P=0.199$]。S组术后最后随访时主侧凸Cobb角与L组差异无统计学意义。术初次侧凸Cobb角度L组大于S组($P=0.035$)。两组术后即刻次侧凸Cobb角度差异无统计学意义,最后总随访时Cobb角度差异也无统计学意义。

2.2 矢状位影像学测量结果

结果(表2)表明:术前两组后侧位片胸椎后凸角(T₅~T₁₂)结果相近;术后即刻及最后总随访时胸椎后凸角差异均无统计学意义;两组腰椎前凸角(L₁~S₁)在手术前、术后即刻、最后总随访时均类似,差异无统计学意义。

2.3 融合椎体数、失血量、输血量及SRS-22量表得分

结果(表3)表明:两组融合椎体数量差异有统计学意义($P=0.027$);两组下融合椎与下终椎差值差异无统计学意义($P=0.098$);两组术中出血量、术中输血量差异均无统计学意义。两组功能/活动度、疼痛、自我形象/外观及精神健康维度评分差异均无统计学意义;在满意度维度中L组得分明显低于S组($P=0.037$,表4)。

表 1 两组冠状位影像学参数比较

Tab 1 Comparison of coronal plane changes between two groups

(n=55, $\bar{x} \pm s, \alpha^\circ$)

Group	Major curve Cobb angle			Minor curve Cobb angle		
	Pre-operative	Immediate PO	Follow-up final	Pre-operative	Immediate PO	Follow-up final
S	53.7 ± 12.79	15.2 ± 8.59	18.2 ± 7.42	30.1 ± 12.10	15.1 ± 5.47	16.9 ± 5.89
L	54.3 ± 13.02	16.9 ± 8.73	20.0 ± 8.37	34.8 ± 10.85	16.1 ± 6.20	17.4 ± 6.89
P value	0.791	0.324	0.240	0.035*	0.372	0.689

S: Pre-operation course <2 years; L: Pre-operation course ≥2 years. * P<0.05

表 2 两组矢状位影像学参数比较

Tab 2 Comparison of sagittal plane change between two groups

(n=55, $\bar{x} \pm s, \alpha^\circ$)

Group	T ₅ -T ₁₂ kyphotic angle			L ₁ -S ₁ lordosis angle		
	Pre-operative	Immediate PO	Follow-up final	Pre-operative	Immediate PO	Follow-up final
S	26.6 ± 9.52	24.5 ± 7.01	26.3 ± 5.64	58.5 ± 8.59	53.4 ± 7.14	55.3 ± 6.87
L	25.1 ± 9.04	22.8 ± 6.01	25.6 ± 5.66	56.9 ± 10.20	51.7 ± 7.02	54.3 ± 5.95
P value	0.419	0.160	0.501	0.370	0.233	0.400

S: Pre-operation course <2 years; L: Pre-operation course ≥2 years

表 3 融合椎体数及术中失血量比较

Tab 3 Comparison of fusion vertebrae number and intraoperation blood loss between two groups

(n=55, $\bar{x} \pm s$)

Group	Number of fused vertebrae	Fusion level below LEV	Estimated blood loss V/ml	Total infusion V/ml
S	9.5 ± 1.89	0.55 ± 1.26	989 ± 405	676 ± 325
L	10.3 ± 1.48	0.95 ± 1.25	1 055 ± 377	762 ± 298
P value	0.027*	0.098	0.376	0.154

S: Pre-operation course <2 years; L: Pre-operation course ≥2 years; LEV: Lower end vertebra. * P<0.05

表 4 两组患者填写 SRS-22 量表结果比较

Tab 4 Comparison of SRS-22 domains between 2 groups

(n=55, $\bar{x} \pm s$)

Group	Function/activity	Pain	Self-image/appearance	Mental health	Satisfaction of management
S	4.1 ± 0.53	4.4 ± 0.53	4.0 ± 0.41	4.3 ± 0.54	4.0 ± 0.70
L	3.9 ± 0.52	4.3 ± 0.56	3.9 ± 0.51	4.1 ± 0.53	3.7 ± 0.78
P value	0.090	0.282	0.192	0.240	0.037*

S: Pre-operation course <2 years; L: Pre-operation course ≥2 years. * P<0.05

3 讨论

AIS 起病隐匿,在脊柱侧凸筛查及体检制度尚不完善的中国大陆,大部分患者均因身体出现畸形而首次就诊。少部分患者则是体检发现或偶然发现(如拍胸片等)。本研究中,为了尽可能地反映脊柱侧凸的自然病程,所有入选患者均为因出现身体畸形而首次就诊者。Deviren 等^[5]研究发现,特发性脊柱侧凸弯曲的柔韧性与患者年龄的相关性极高($r = -0.6, P < 0.01$)。Clamp 等^[6]也得出了相似的结论。在本次研究中,虽然患者手术时的年龄相似,Risser 征也相似,但两组患者弯曲的柔韧性仍然存在一定的差异。这说明术前病程长短可能也会影响脊柱侧凸弯曲的柔

韧性。虽然两组患者柔韧性存在一定的差异,但两组患者的主弯矫正率相似。这可能是由于均使用了全椎弓根螺钉系统,该系统提供的强大矫形力掩盖了两组柔韧性的差异。

两组患者主弯 Cobb 角的大小相似,但 L 组次弯 Cobb 角大于 S 组。这说明次弯 Cobb 角的大小受病程长短的影响较大。这对脊柱侧凸矫形手术融合节段的选择会产生一定的影响。对于 Lenke 1 型、5 型患者而言,非结构性次侧凸不需进行融合,只需对主弯进行选择性的融合。但在进行选择性的融合时,需要满足一定的条件。对于主胸弯患者,Lenke 等^[7]认为当胸弯和腰弯的 Cobb 比率 ≥1.2 时,可以选择性地融合胸弯。Sanders 等^[8]则认为对于主胸腰弯/腰弯 AIS

患者,当胸腰弯/腰弯和胸弯 Cobb 比率 ≥ 1.25 时,可以选择性地融合胸腰弯/腰弯。对于术前病程 ≥ 2 年的患者,由于次弯 Cobb 角增大,主弯与次弯 Cobb 角比率接近 1,某些 Lenke 1 型、5 型患者因而无法进行选择性地主弯融合,从而增加融合节段。这可能是 L 组融合椎体数多于 S 组的原因之一。L 组主弯柔韧性较差可能是其融合椎体数较多的另一原因。无论是术前还是术后,病程长短对患者胸椎后凸角及腰椎前凸角都没有产生影响。对于远端融合水平及术中出血、总输血量等亦无影响。

特发性脊柱侧凸对青少年患者心理健康的危害显而易见^[9]。Clayson 等^[10]研究了年龄对特发性脊柱侧凸患者心理健康的影响。该项研究发现,年龄小于 15 岁的患者术后使用加利福尼亚心理调查表进行测评,其各个指标都在正常范围内。相反,年龄大于 16 岁的患者在术前其明尼苏达多相人格调查表多个子量表的得分在正常范围之外,在术后这些项目的得分更加偏离正常。一般来说,年龄越大,脊柱侧凸的自然病程越长,这似乎提示我们病程长短可能会对患者的心理健康产生影响。但是,依据此项研究得出手术年龄越大,术后心理结局越差的结论值得怀疑。因为不同年龄段的青少年患者,其认知成熟度存在较大的差别^[11]。在本次研究中,两组患者的年龄相似,但是,心理健康维度的得分无明显差别。这存在两种可能:(1)病程长短对患者的心理健康确实不存在影响;(2)由于本次使用的 SRS-22 量表,只有 5 个评价心理健康的项目,量表太短而导致敏感度较低,未能反映真实状况。术前病程长短对功能/活动度、疼痛及外观 3 个维度的得分无明显影响。

虽然两组在冠状位及矢状位上畸形的改善是相似的,但两组患者治疗满意度维度的得分仍然存在显著差异,病程 ≥ 2 年的患者对手术的满意度较低。这说明随着病程的增加,患者对手术的期望值会增加,较高的期望值常导致对手术治疗的满意度下降。此外,AIS 患者术前的社会心理状况会影响患者对手术治疗的满意度,术前存在的社会心理功能障碍会增加对治疗不满意的可能性^[12]。虽然本次研究并未对两组患者的术前心理状态进行评估,但可以推测脊柱侧凸对 L 组患者的影响时间更长,该组患者出现社会心理功能障碍的可能性更大。当然,真实状况的获得仍然需要对不同病程术前患者进行心理评估。

本研究主要的研究目的是明确术前病程是否会对脊柱侧凸矫形手术及患者的术后生存质量产生影响。但是,由于脊柱侧凸起病隐匿,AIS 患者自然病程的获得极其困难。只能用发现脊柱侧凸至手术这段时间来反映自然病程,这是本次研究的局限之一。

患者健康相关生存质量的评估受多种主客观因素的干扰(如患者的性格特征、家庭经济状况及畸形进展速度等),这些都是本次研究的干扰因素。本次研究的另一干扰因素是两组间术前支具治疗例数的差别,Noonan 等^[13]的研究表明术前支具治疗与否对患者术后的心理状况也会产生影响。

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