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Acute angle deformity: A special local lesion of chest wall bone structures

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Abstract

Acute angle deformity is a special concept that we proposed, which refers to a special local lesion in thoracic deformity. This kind of lesion is a serious local pathological change, which cannot be treated by conventional surgery, and it must be corrected by special technology. This article introduces the characteristics and treatment of this deformity.

Keywords: Acute angle deformity, thoracic deformity

Introduction

In broad sense, chest wall deformity refers to the abnormal appearance of chest wall caused by all structures of chest wall. These structures can be bone structures, muscles or other soft tissues; The narrow sense of the chest wall deformity refers to the abnormal appearance caused by bone structures of chest wall. Traditionally, when we talk about thoracic deformity, we usually refer to the latter, i.e., that of abnormality of bone structures^[1,2]. Since the shape of thoracic deformity is complex and diverse, no two individuals have the same shape actually. For the convenience of diagnosis and treatment, we divide all the chest wall deformities into two categories: one is depression deformity, and the other is protrusion deformity^[3]. This classification first focuses on the main features of the deformities, and then divides them into various subtypes according to the details of the deformities. Each subtype corresponds to a special deformity. Through such classification, all chest wall deformities are brought into an organic system, not only the common features are reflected, but also the individual characteristics of the deformity are displayed. However, this classification method cannot fully reflect all the characteristics of deformities. In the process of studying the pathological characteristics of the deformities, we found that a special lesion could appear in the local area of the chest wall of the deformity. The biggest morphological feature of this lesion was the acute angle change, which could exist in both the depression and protrusion deformities. When this kind of change appears, although it is not necessarily the most serious lesion, it will bring great difficulties to the treatment. Because of this, we made a separate name for it, namely acute angle deformity.

Acute angle deformity has distinctive features and is easy to identify. In the depression deformity, if the patient is thin, it can show a deep groove at the bottom of the depression. If there is lots of soft tissues filling on the surface, although it is not easy to be identified by the naked eye, it can be found by palpation. In the protrusion deformity, the acute angle deformity often presents as a convex ridge. If the patient is thin, it will be very obvious (Fig. 1). In addition to the above two cases, acute angle deformity can also exist in two special situations, which include: (1) the margin of depression deformity. The margin of some depression deformities may be convex ridge, which may also form acute angle deformity (Fig. 2). Because this kind of chest wall deformity has both depression and protrusion, it can be regarded as a special type of complex deformity; (2) the normal complex chest wall deformity. This kind of deformity has both depression and protrusion, and acute angle deformity can exist in the bottom of depression or the top of protrusion (Fig. 3). Although the existence of acute angle deformity cannot change the nature of complex chest wall deformity, it will increase the complexity of this deformity.

In general, the acute angle deformity of protrusion chest wall deformity has obvious body surface characteristics, while that of depression chest wall deformity is not obvious. However, if the imaging examination is performed, they can be found easily.

The specific feature is that the local structure of the chest wall presents acute angle changes (Fig. 2, 3, 4). This is the only criterion for the diagnosis of such a deformity.



Fig 1: Acute angle deformity in protrusion thoracic deformity



Fig 2: The margin of the depression thoracic deformity presents acute angle deformity (imaging examination).

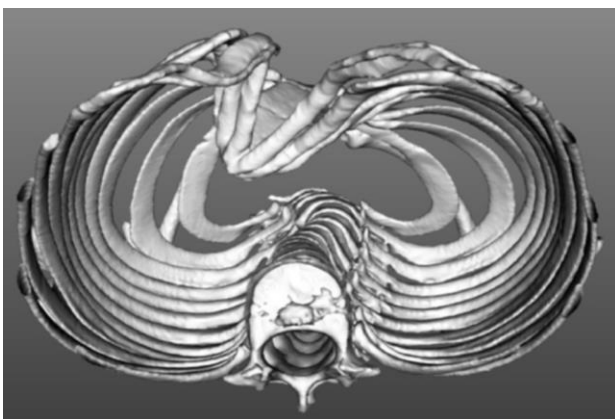


Fig 3: Acute angle deformity in complex thoracic deformity (imaging examination)

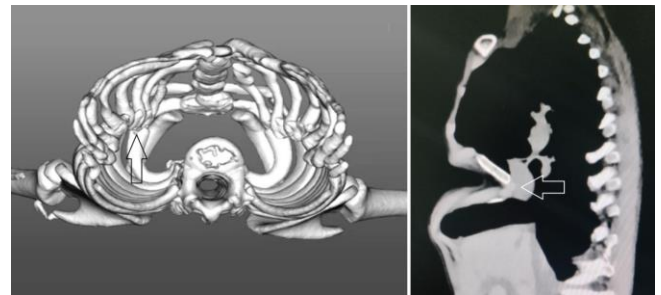


Fig 4: Acute angle deformity in depression of thoracic deformity (imaging examination).

Generally, the normal anterior or lateral chest wall is relatively smooth, without obvious local changes. Even the common pectus excavatum, pectus carinatum, flat chest and barrel chest rarely have serious local lesions. Therefore, it can be assumed that once acute angle deformity occurs, it indicates that a very severe structural change has occurred locally. Because this kind of change is extremely violent, it will be difficult to be corrected.

Since Nuss procedure appeared, the treatment of thoracic deformity has entered the era of minimally invasive surgery [4]. All the operations for the treatment of thoracic deformity are divided into two categories: one is for depression deformity, including Nuss procedure [4], Wang procedure [5-9] and Wung procedure [10, 11]; the other is for protrusion deformity, including Abramson procedure [12] and Wenlin procedure [13-18]. From the nature of surgery, Nuss procedure [4] and Abramson procedure [12] are mechanical external force plastic surgery, while Wang procedure and Wenlin procedure are template plastic surgery [1, 2]. It can be seen from the mechanism of surgery that Nuss procedure and Abramson procedure are indirect plastic surgery, and it is difficult to deal with local lesions. Therefore, for local acute angle deformity, these two operations are not good choices. Wang procedure [5-9] and Wenlin procedure [13-18] are direct plastic surgery, mainly aiming at local correction of lesions, which are more suitable for the treatment of acute angle deformity theoretically.

However, as mentioned above, acute angle deformity is a very severe structural change, and there is often severe bone hyperplasia at the top of the acute angle. It is almost impossible to change its shape by conventional surgical methods. At this time, a special technique is needed to help the correction, i.e. pre-shaping [19]. Pre-shaping is an auxiliary correction technique, which mainly refers to a series of special operations implemented before formal correction. Its purpose is to reduce local stress or tension and lay a foundation for formal correction. There are many methods of pre-shaping, but for acute angle deformity, there is only one method, that is, destructive plastic surgery [1,2]. This surgery is similar to the previous open surgery [20], which includes direct incision, wedge resection or partial resection of the acute angle area. After these operations are completed, the local stress or tension of acute angle deformity is completely released, which makes it possible for the next formal correction.

It can be seen from the above analysis that if acute angle deformity exists in a certain thoracic deformity, it is not only difficult to obtain good results directly using conventional surgical methods, but also may lead to surgical failure. The correct method is to change the structure of acute angle deformity with pre-shaping technique at first,

and then carry out conventional surgery to obtain good results.

In general, acute angle deformity is an important concept that we proposed. Until now, we have done a lot of work for this deformity and achieved satisfactory results. Recently, we put forward a new concept to treat thoracic deformity, that is Wenlin principle ^[21, 22], and the treatment of acute angle deformity is a direct reflection of this concept. Our experience shows that full understanding of acute angle deformity not only contributes to a more accurate understanding of thoracic deformities, but also provides theoretical guidance for the correction of complex deformities, and ultimately improves the overall treatment level of deformities.

References

1. Wang W. Basic theories and concepts of chest wall surgery. *International Journal of Surgery Science*. 2022;6(3):12-14. [Doi.org/10.33545/surgery.2022.v6.i3a.909](https://doi.org/10.33545/surgery.2022.v6.i3a.909).
2. Wang W. Chest wall surgery: Chest wall plastic surgery or chest wall orthopedics. *International Journal of Orthopaedics Sciences* 2022;8(3):82-84. [Doi.org/10.22271/ortho.2022.v8.i3b.3174](https://doi.org/10.22271/ortho.2022.v8.i3b.3174).
3. Wang W, Chen C, Li X, *et al*. Overall classification of thoracic deformities. *Chinese Journal of clinical cardiothoracic surgery*. 2018;25:981-985.
4. Pajić M, Vidović D, Jokić R, Antić J, Čubrić N, Fratrić I, *et al*. Comparison of the Standard vs. Thoracoscopic Extrapleural Modification of the Nuss Procedure—Two Centers' Experiences. *Children (Basel)* 2022;9(4):557.
5. Wang WL, Chen CM, Long WG, *et al*. Wang procedure: novel minimally invasive procedure for pectus excavatum children with low age. *Case Reports and Images in Surgery*. 2018;1:1-2.
6. Wang W, Long W, Liu Y, Bin C, Juan L. Wang procedure: Background, characteristics and application. *International Journal of Surgery Science*. 2022;6(3):96-100. doi.org/10.33545/surgery.2022.v6.i3b.928.
7. Wang W, Long W, Liu Y, Bin C, Juan L. Wang procedure: A reasonable choice for reoperation after failure of Nuss procedure for pectus excavatum. *International Journal of Surgery Science*. 2022;6(3):68-71. doi.org/10.33545/surgery.2022.v6.i3b.921.
8. Wang W, Long W, Liu Y, Bin C, Juan L. Wang procedure for treatment of asphyxiating thoracic deformity. *Journal of Pediatric Surgery Case Reports*. 2022;85:102404. doi.org/10.1016/j.epsc.2022.102404.
9. Wang W, Chen C, Long W, Li X, Wang W. Wang procedure for treatment of pectus excavatum. *SL Clin Exp Cardiol*. 2018;2(1):113.
10. Wang W, Long W, Liu Y, Bin C, Juan L. Wung procedure: A minimally invasive operation for pectus excavatum. *International Journal of Case Reports in Surgery*. 2022;4(1):19-21.
11. Wang W, Long W, Liu Y, Bin C, Juan L. Application of Wenlin procedure combined with Wung procedure in operation of severe pectus carinatum. *National Journal of Clinical Orthopaedics*. 2022;6:09-16. doi.org/10.33545/orthor.2022.v6.i3a.368.
12. Özkaya M, Bilgin M. Minimally invasive repair of pectus carinatum by modification of the Abramson technique. *Wideochir Inne Tech Maloinwazyjne*. 2018;13(3):383–387.
13. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin procedure: A novel surgical technique for pectus carinatum. *International Journal of Case Reports in Surgery*. 2022;4(1):10-12.
14. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin procedure for treatment of pectus carinatum. *International Journal of Surgery Science*. 2022;6(3):74-77. doi.org/10.33545/surgery.2022.v6.i3b.923.
15. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin procedure for treatment of barrel chest. *International Journal of Orthopaedics Sciences*. 2022;8(3):43-45. doi.org/10.22271/ortho.2022.v8.i3a.3171.
16. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin procedure for aphyxiating thoracic dystrophy with severe pulmonary hypertension. *International Journal of Case Reports in Surgery*. 2022;4:11-12.
17. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin procedure: An ideal minimally invasive surgery for barrel chest. *International Journal of Advanced Research in Medicine*. 2022;4:37-39. doi.org/10.22271/27069567.2022.v4.i2a.402.
18. Wang W, Long W, Liu Y, Bin C, Juan L. Application of Wenlin procedure in the treatment of thoracic deformity. *International Journal of Surgery Science*. 2022;6:88-91. doi.org/10.33545/surgery.2022.v6.i3b.926.
19. Wang W, Long W, Liu Y, Bin C, Juan L. Application of reshaping technique in Wung procedure of severe asymmetric pectus excavatum. *International Journal of Case Reports in Surgery*. 2022;4:01-04.
20. Kanagaratnam A, Phan S, Tchantchaleishvili V, Phan K. Ravitch versus Nuss procedure for pectus excavatum: systematic review and meta-analysis. *Ann Cardiothorac Surg*. 2016;5(5):409–421.
21. Wang W, Long W, Liu Y, Bin C, Juan L. The highest level of surgical treatment of pectus excavatum. *International Journal of Orthopaedics Sciences* 2022;8(3):217-219. doi.org/10.22271/ortho.2022.v8.i3d.3200.
22. Wang W, Long W, Liu Y, Bin C, Juan L. Wenlin principle in the treatment of pectus excavatum. *International Journal of Surgery Science*. 2022;6(3):72-73. [Doi.org/10.33545/surgery.2022.v6.i3b.922](https://doi.org/10.33545/surgery.2022.v6.i3b.922).

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