

# 新生儿颅骨凹陷骨折手术治疗

刘渤 谢仕刚 岳喜赞 王广宇

**【摘要】** **目的** 探讨新生儿颅骨凹陷骨折的手术方式。**方法与结果** 纳入 2021 年 1 月至 2023 年 12 月在山东大学附属儿童医院进行手术治疗的 8 例新生儿颅骨凹陷骨折患儿,术前均行头部 CT 薄层扫描 + 颅骨三维重建,根据凹陷部位、范围和深度,分别予以凹陷边缘钻孔,骨撬撬起凹陷颅骨复位(3 例);骨撬撬起后凹陷颅骨再次塌陷,延长切口显露全部凹陷区域,将塑形后的可吸收连接片固定于撬起后复位的凹陷区域(2 例);前凶外侧角处钝性分离颅骨和硬脑膜,深入骨撬撬起凹陷颅骨复位(1 例);凹陷边缘冠状缝处钝性分离颅骨和硬脑膜,深入骨撬撬起凹陷颅骨复位(2 例)。术后第 1 天复查头部 CT 均显示凹陷复位良好。1 例合并凹陷区域外线性骨折患儿骨折自然愈合,1 例合并硬膜外出血患儿血肿自行吸收。平均随访 6.80 个月,复查头部 CT 均显示颅骨发育正常,无再次颅骨凹陷。**结论** 手术治疗可以即刻复位颅骨凹陷骨折,对于邻近前凶或骨缝的骨折,可以通过前凶外侧角或未闭合的骨缝撬起凹陷,这一术式更为微创。

**【关键词】** 颅骨骨折; 婴儿, 新生; 神经外科手术

## Surgical treatment of depressed fracture of skull in neonates

LIU Bo, XIE Shi-gang, YUE Xi-zan, WANG Guang-yu

Department of Neurosurgery, Children's Hospital Affiliated to Shandong University, Ji'nan 250022, Shandong, China

Corresponding author: WANG Guang-yu (Email: wgyujc@163.com)

**【Abstract】** **Objective** To explore the surgical treatment of depressed fracture of skull in neonates. **Methods and Results** Eight neonates with depressed fracture of skull who underwent surgery in Children's Hospital Affiliated to Shandong University from January 2021 to December 2023 were included, and all of them underwent CT thin-slice scan + 3D reconstruction of skull before surgery. According to the location, extent and depth of the depression, the depressed edge was drilled and the depressed skull was reduced by bone pry (3 cases). The depressed skull collapsed again after the bone was pried up, the skin incision was extended to reveal the depressed area, and the shaped absorbable connector was fixed in the depressed area after prying up (2 cases). Blunt separation of the skull and dura mater at the lateral corner of the anterior fontanelle, and deep bone pry to pry up the depressed skull for reduction (one case). The skull and dura mater were bluntly separated from the coronal suture at the edge of the depression, and the depressed skull was pried up and reduced by deep bone pry (2 cases). On the first day after surgery, the re-examination of CT thin-slice scan + 3D reconstruction of skull showed that the depression reduction was satisfactory. Spontaneous fracture healing was happened in one case with linear fractures; hemorrhage resorption spontaneously was happened in one case with epidural hematoma. The average follow-up was 6.80 months, and the re-examination of CT thin-slice scan + 3D reconstruction of skull showed that the skull development was normal and there was no re-depression. **Conclusions** Immediate reduction of depressed fracture of skull can be achieved with surgery, and for fractures close to the anterior fontanelle or suture, the depression can be prying up through the lateral angle of the anterior fontanelle or the unclosed suture, which is more minimally invasive.

**【Key words】** Skull fractures; Infant, newborn; Neurosurgical procedures

**Conflicts of interest:** none declared

doi:10.3969/j.issn.1672-6731.2024.10.008

作者单位: 250022 济南, 山东大学附属儿童医院神经外科

通讯作者: 王广宇, Email: wgyujc@163.com

新生儿颅骨凹陷骨折临床罕见,是特殊类型的颅骨骨折,国外报道其发病率为(1~2.5)/万<sup>[1]</sup>。分娩过程中处理不当,如产钳挤压、剖宫产手术切口过小;新生儿颅骨钙含量较少,骨化不全;宫内因素如骨盆狭小、子宫肌瘤;妊娠期意外伤害等均可导致新生儿颅骨凹陷骨折<sup>[2-5]</sup>。治疗方法主要包括保守治疗、产科负压吸引器治疗、手术治疗等,目前尚无一致性意见<sup>[6]</sup>。山东大学附属儿童医院近3年对8例新生儿颅骨凹陷骨折患儿予以手术复位凹陷颅骨,回顾其手术过程及术后转归,探讨新生儿颅骨凹陷骨折的手术方案,以为新生儿颅骨凹陷骨折选择适宜手术方法提供指导。

## 对象与方法

### 一、研究对象

1. 纳入与排除标准 (1)新生儿定义为脐带结扎至出生后28 d<sup>[7]</sup>。(2)均经头部CT薄层扫描+颅骨三维重建确诊为颅骨凹陷骨折且符合手术指征,即颅骨凹陷直径>2.50 cm、深度>0.50 cm<sup>[8]</sup>。(3)均为闭合性颅骨凹陷骨折。(4)均手术复位凹陷颅骨。(5)受伤原因为产伤或跌落伤。(6)排除开放性颅骨凹陷骨折、未行手术治疗,或者临床或随访资料不完整的患儿。(7)所有患儿家属均对手术方案和手术风险知情并签署知情同意书。

2. 一般资料 选择2021年1月至2023年12月在山东大学附属儿童医院神经外科和新生儿科住院治疗的新生儿颅骨凹陷骨折患儿8例,男性6例,女性2例;年龄为出生后1~16 d,平均为6.38 d;足月产7例,早产1例(例7);自然分娩3例(例3、例5、例8),剖宫产5例;7例出生后即发现颅骨凹陷骨折,1例(例2)为自婴儿床跌落所致;凹陷部位为顶部6例,额部2例(例3、例5)。术前头部CT薄层扫描+颅骨三维重建显示,凹陷区域内均无骨质断裂,凹陷范围为4.50 cm×3.00 cm×0.70 cm~6.00 cm×5.00 cm×1.00 cm,平均4.81 cm×3.94 cm×0.76 cm;凹陷深度0.60~1.00 cm,平均0.76 cm;1例(例7)颅骨凹陷区域外可见线性骨折;1例(例2)合并少量硬膜外出血。8例患儿的临床资料参见表1。

### 二、治疗方法

1. 手术方法 患儿仰卧位,头偏向健侧,气管插管全身麻醉。(1)颅骨钻孔撬起颅骨复位:5例患儿(例2、例4、例6、例7、例8)于颅骨凹陷边缘皮肤做小切口,长度为1.50~2.00 cm,再于颅骨凹陷边缘钻

一孔,直径约0.50 cm,骨撬撬起复位凹陷颅骨(图1),其中2例患儿(例2、例4)骨撬撬起后凹陷颅骨再次塌陷,遂延长皮肤切口显露全部凹陷区域,将可吸收连接片按照复位后的颅骨表面弧度塑形并固定于撬起后复位的凹陷区域,以防止颅骨再次塌陷(图2)。(2)自前凶外侧角撬起颅骨复位:1例患儿(例1)因凹陷区域邻近前凶,遂自前凶外侧角做弧形切口,长度为1.50 cm,自前凶外侧角游离颅骨边缘,深入骨撬撬起复位凹陷颅骨。(3)自冠状缝撬起颅骨复位:2例患儿(例3、例5)因凹陷区域邻近冠状缝,遂沿冠状缝做切口,长度为1.50 cm,自凹陷边缘冠状缝钝性分离颅骨和硬脑膜,深入骨撬撬起复位凹陷颅骨(图3)。所有患儿术后避免凹陷区域受压,1例(例7)凹陷区域外线性骨折和1例(例2)合并少量硬膜外出血患儿均未予特殊处理。

2. 疗效评价 8例患儿均于术后第1天复查头部CT薄层扫描+颅骨三维重建,观察颅骨复位情况以及是否新发脑出血。出院后门诊随访,观察头部外观是否有凹陷;术后3~6个月再次复查头部CT薄层扫描+颅骨三维重建,观察颅骨发育情况以及是否再发生颅骨凹陷。

## 结 果

本组8例患儿均顺利完成手术,2例(例2、例4)术中骨撬撬起后再次颅骨塌陷患儿,经塑形后的可吸收连接片固定,未再出现颅骨塌陷。术后第1天复查头部CT薄层扫描+颅骨三维重建均显示凹陷颅骨复位良好,无新发脑出血。1例(例7)凹陷区域外线性骨折患儿,骨折自然愈合;1例(例2)合并硬膜外出血患儿,血肿自行吸收。术后随访3~12个月,平均6.80个月,所有患儿头部外观均正常,复查头部CT薄层扫描+颅骨三维重建显示颅骨发育正常,未再发生颅骨凹陷。

## 讨 论

新生儿颅骨凹陷骨折的治疗方案各医疗中心尚不统一,亦无确定的治疗指南<sup>[6]</sup>,主要包括保守治疗、产科负压吸引器治疗、手术治疗等<sup>[9-12]</sup>。国外有学者主张对新生儿颅骨凹陷骨折采取保守治疗,不进行任何处理,仅门诊定期复查,发现大部分患儿于6个月内凹陷颅骨自行复位<sup>[13-14]</sup>。国内施伟等<sup>[15]</sup>报告10例新生儿颅骨凹陷骨折患儿,8例保守治疗、2例手术治疗,结果显示,保守治疗患儿均于2~6个

表1 8例新生儿颅骨凹陷骨折患儿的临床资料

Table 1. Clinical data of 8 neonates with depressed fracture of skull

序号	性别	就诊年龄 (d)	凹陷原因	凹陷部位	凹陷范围 (cm)	凹陷深度 (cm)	脑出血	骨质断裂	手术方式	术后转归	随访转归
1	女性	1	产伤	左侧顶部	5.00×4.50×0.70	0.70	无	无	前凶外侧角处游离颅骨边缘, 深入骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
2	男性	16	跌落伤	右侧顶部	6.00×4.00×0.80	0.80	少量	无	骨撬撬起后凹陷颅骨再次塌陷, 延长切口显露全部凹陷区域, 将塑形后的可吸收连接片固定于撬起后复位的凹陷区域	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
3	男性	1	产伤	左侧额部	5.00×4.00×0.80	0.80	无	无	凹陷边缘冠状缝处钝性分离颅骨和硬脑膜, 深入骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
4	男性	14	产伤	左侧顶部	4.00×4.00×0.60	0.60	无	无	骨撬撬起后凹陷颅骨再次塌陷, 延长切口显露全部凹陷区域, 将塑形后的可吸收连接片固定于撬起后复位的凹陷区域	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
5	女性	3	产伤	左侧额部	4.00×3.00×0.90	0.90	无	无	凹陷边缘冠状缝处钝性分离颅骨和硬脑膜, 深入骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
6	男性	3	产伤	右侧顶部	4.50×3.00×0.70	0.70	无	无	凹陷边缘钻孔, 骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
7	男性	2	产伤	右侧顶部	6.00×5.00×1.00	1.00	无	顶骨	凹陷边缘钻孔, 骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷
8	男性	11	产伤	右侧顶部	4.00×4.00×0.60	0.60	无	无	凹陷边缘钻孔, 骨撬撬起凹陷颅骨复位	凹陷骨折复位良好, 无新发脑出血	头部外观正常, 颅骨发育正常, 无再次颅骨凹陷

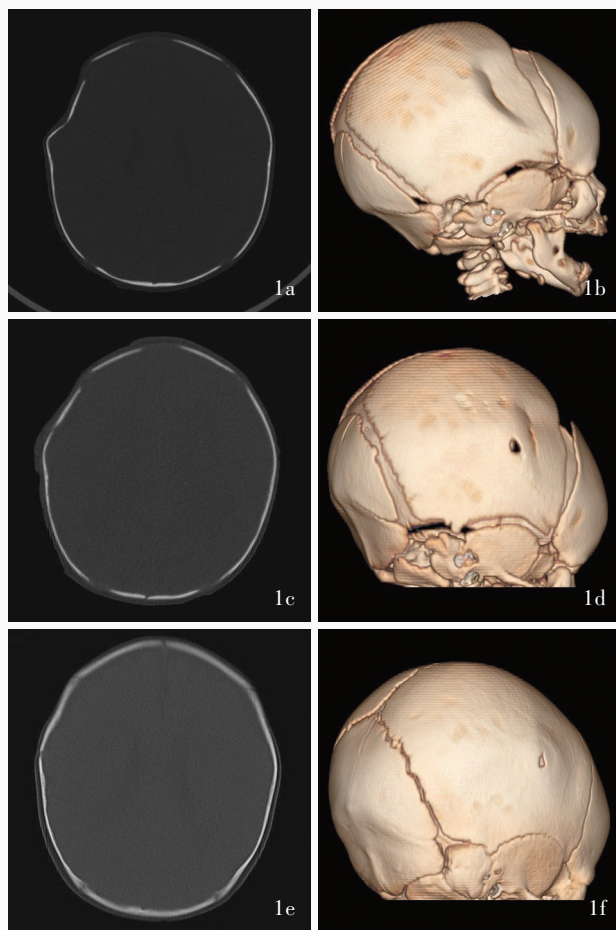
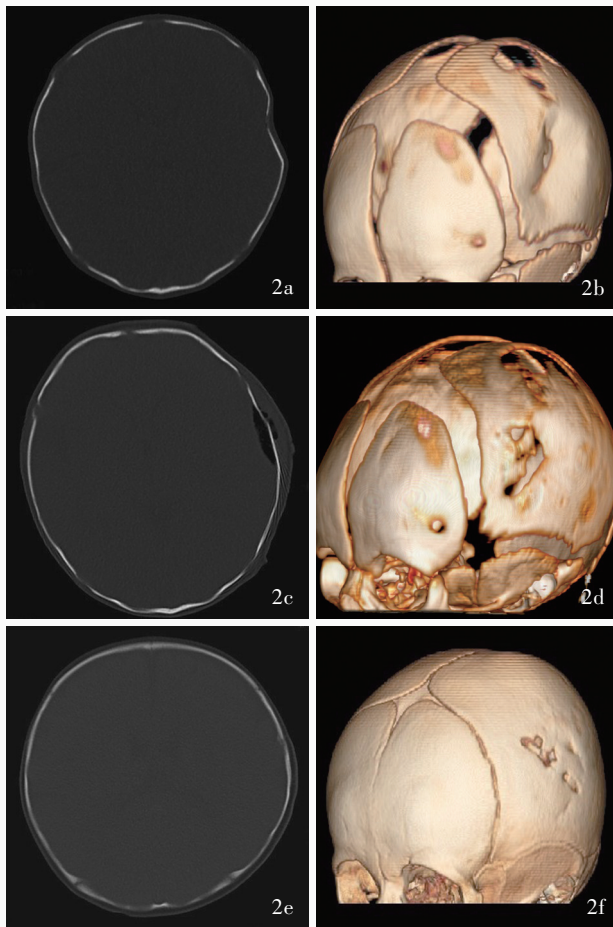


图1 例8患儿,因右侧顶部凹陷11 d入院,临床诊断为右侧顶部颅骨凹陷骨折,行颅骨凹陷骨折复位术(凹陷边缘钻孔,骨撬撬起复位凹陷颅骨)。手术前后头部CT薄层扫描+颅骨三维重建所见 1a 术前横断面CT骨窗像显示,右侧顶骨骨质凹陷,范围4.00 cm×4.00 cm×0.60 cm,深度0.60 cm 1b 术前颅骨三维重建显示,右侧顶骨骨质凹陷,范围4.00 cm×4.00 cm×0.60 cm,深度0.60 cm 1c 术后第1天复查横断面CT骨窗像显示,凹陷骨折复位良好 1d 术后第1天复查颅骨三维重建显示,凹陷骨折复位良好 1e 术后3个月复查横断面CT骨窗像显示,颅骨发育正常,无再次颅骨凹陷 1f 术后3个月复查颅骨三维重建显示,颅骨发育正常,无再次颅骨凹陷

Figure 1 Case 8 patient was admitted to hospital for 11 d due to the depressed fracture of the right parietal lobe, and was clinically diagnosed with a depressed fracture of the right parietal lobe of skull, and underwent depression fracture of skull reduction surgery (drilling of the edge of the depression, and the reduction of the depressed fracture by bone prying). Head CT thin - slice scan + 3D reconstruction of skull findings before and after surgery Preoperative axial CT bone window (Panel 1a) + 3D reconstruction of skull (Panel 1b) showed that the right parietal bone was bony depression with a range of 4.00 cm × 4.00 cm × 0.60 cm, and a depth of 0.60 cm. On the first day after surgery, axial CT bone window (Panel 1c) + 3D reconstruction of skull (Panel 1d) showed the depressed fracture was well reduced. Follow - up 3 months after surgery, axial CT bone window (Panel 1e) + 3D reconstruction of skull (Panel 1f) showed the skull was developed normally and there was no re-depression.



**图 2** 例 4 患儿,因左侧顶部凹陷 14 d 入院,临床诊断为左侧顶部颅骨凹陷骨折,行颅骨凹陷骨折复位术(骨撬撬起后凹陷颅骨再次塌陷,延长皮肤切口显露全部凹陷区域,将塑形后的可吸收连接片固定于撬起后复位的凹陷区域)。手术前后头部 CT 薄层扫描+颅骨三维重建所见 2a 术前横断面 CT 骨窗像显示,左侧顶骨骨质凹陷,范围为 4.00 cm×4.00 cm×0.60 cm,深度 0.60 cm 2b 术前颅骨三维重建显示,左侧顶骨骨质凹陷,范围为 4.00 cm×4.00 cm×0.60 cm,深度 0.60 cm 2c 术后第 1 天复查横断面 CT 骨窗像显示,凹陷骨折复位良好 2d 术后第 1 天复查颅骨三维重建显示,凹陷骨折复位良好 2e 术后 4 个月复查横断面 CT 骨窗像显示,颅骨发育正常,无再次颅骨凹陷 2f 术后 4 个月复查颅骨三维重建显示,颅骨发育正常,无再次颅骨凹陷

**Figure 2** Case 4 patient was admitted to hospital for 14 d due to the depressed fracture of the left parietal lobe, and was clinically diagnosed with a depressed fracture of the left parietal lobe of the skull, and underwent depressed fracture of skull reduction surgery (the depressed skull collapsed again after the bone pry was pried, the skin incision was extended to expose the entire depressed fracture area, and the shaped absorbable connection piece was fixed in the depressed fracture area that was reduced after prying). Head CT thin - slice scan + 3D reconstruction of skull findings before and after surgery Preoperative axial CT bone window (Panel 2a) + 3D reconstruction of skull (Panel 2b) showed the left parietal bone was depressed in the range of 4.00 cm×4.00 cm×0.60 cm, and the depth of 0.60 cm. On the first day after surgery, axial CT bone window (Panel 2c) + 3D reconstruction of skull (Panel 2d) showed the depressed fracture was well reduced. Follow-up 4 months after surgery, axial CT bone window (Panel 2e) + 3D reconstruction of skull (Panel 2f) showed the skull was developed normally and there was no re-depression.

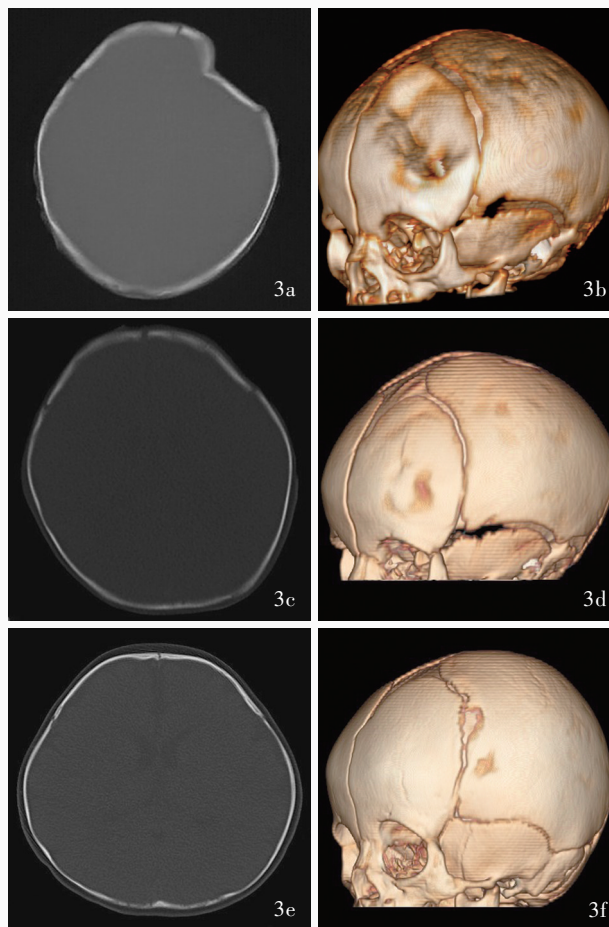
月凹陷颅骨自行复位。然而,并非所有患儿均能够自行复位,Preston 等<sup>[16]</sup>和 Hung 等<sup>[17]</sup>均报告过保守治疗复位失败的病例,且保守治疗时间较长,这一过程中脑组织持续受压,可能导致神经发育障碍或神经功能障碍。产科负压吸引器治疗新生儿颅骨凹陷骨折,国内外均有报道<sup>[18-21]</sup>,但各项研究对治疗中负压吸引器压力的设置、吸引时间的维持不同,且操作过程中需对患儿头部进行持续牵拉,存在颅内出血风险。目前手术治疗主要有两种方式,一种是单纯骨撬撬起凹陷颅骨复位,另一种是铣刀铣下凹陷颅骨整复复位。孙宁等<sup>[22]</sup>采用单纯骨撬撬起凹陷颅骨复位治疗新生儿颅骨凹陷骨折,术中做纵行切口,咬骨钳咬除直径约 0.50 cm 的骨瓣,撬起凹陷颅骨复位。施伟等<sup>[15]</sup>分别采用单纯骨撬撬起凹陷颅骨复位和铣刀铣下凹陷颅骨整复复位各 1 例。

本研究采取小切口,长度 1.50~2.00 cm,5 例患儿(例 2、例 4、例 6、例 7、例 8)于凹陷边缘正常颅骨以直径 0.50 cm 磨头钻一孔,自骨孔处深入骨撬撬起

颅骨,其中 3 例撬起后颅骨复位成功且未再出现颅骨塌陷;2 例(例 2、例 4)撬起后颅骨再次塌陷,考虑原因为新生儿颅骨有机成分较多,骨化不完全,弹性较高,撬起后颅骨再次塌陷,遂术中延长切口,显露全部颅骨凹陷区域,将可吸收连接片按照复位后的颅骨表面弧度进行塑形,再撬起凹陷,然后将塑形后的可吸收连接片固定于撬起后复位的凹陷区域,增加颅骨强度,凹陷颅骨复位良好且未再出现颅骨塌陷。我们的经验是,术中以直径 5 mm 磨头代替钻头进行颅骨钻孔,可以减少对颅骨骨质的破坏;对于撬起后再次塌陷的颅骨,无需铣刀铣下凹陷颅骨整复复位,而是以可吸收连接片塑形后固定于撬起后复位的凹陷区域,可以显著减少手术创伤。本研究有 1 例患儿(例 1)凹陷区域邻近前囟,有 2 例患儿(例 3、例 5)凹陷区域邻近冠状缝,分别于前囟外侧角和凹陷区域近冠状缝处做切口,自前囟外侧角和凹陷边缘冠状缝处游离颅骨边缘,深入骨撬撬起复位凹陷颅骨,术中未钻孔,未破坏正常颅骨。

**图3** 例5患儿,因左侧额部凹陷3 d入院,临床诊断为左侧额部颅骨凹陷骨折,行颅骨凹陷骨折复位术(凹陷边缘冠状缝处钝性分离颅骨和硬脑膜,深入骨撬撬起凹陷颅骨复位)。手术前后头部CT薄层扫描+颅骨三维重建所见 3a 术前横断面CT骨窗像显示,左侧额骨骨质凹陷,范围为4.00 cm×3.00 cm×0.90 cm,深度0.90 cm 3b 术前颅骨三维重建显示,左侧额骨骨质凹陷,范围为4.00 cm×3.00 cm×0.90 cm,深度0.90 cm 3c 术后第1天复查横断面CT骨窗像显示,凹陷骨折复位良好 3d 术后第1天复查颅骨三维重建显示,凹陷骨折复位良好 3e 术后5个月复查横断面CT骨窗像显示,颅骨发育正常,无再次颅骨凹陷 3f 术后5个月复查颅骨三维重建显示,颅骨发育正常,无再次颅骨凹陷

**Figure 3** Case 5 patient was admitted to hospital for 3 d due to the depressed fracture of the left frontal lobe, and was clinically diagnosed with a depressed fracture of the left frontal lobe of the skull, and underwent depressed fracture of skull reduction surgery (blunt separation of the skull and dura mater at the coronal suture at the edge of the depression, and deep bone pry to pry the depressed fracture for reduction). Head CT thin-slice scan + 3D reconstruction of skull findings before and after surgery Preoperative axial CT bone window (Panel 3a) + 3D reconstruction of skull (Panel 3b) showed the left frontal bone was depressed with a range of 4.00 cm×3.00 cm×0.90 cm, and a depth of 0.90 cm. On the first day after surgery, axial CT bone window (Panel 3c) + 3D reconstruction of skull (Panel 3d) showed the depressed fracture was well reduced. Follow-up 5 months after surgery, axial CT bone window (Panel 3e) + 3D reconstruction of skull (Panel 3f) showed the skull was developed normally and there was no re-depression.



我们的经验是,凹陷区域邻近前囟或骨缝时,可以通过未闭合的前囟或骨缝游离颅骨,作为置入骨撬的通道撬起凹陷,从而避免部分骨质丢失。这种方法较颅骨钻孔的手术创伤小,但存在一定限制,不适用于凹陷区域远离前囟和冠状缝的凹陷骨折;此外,对于邻近矢状缝的凹陷骨折,考虑到矢状缝下为矢状窦,出血风险较大,亦不推荐通过矢状缝游离颅骨边缘撬起凹陷。

综上所述,手术治疗可以即刻复位颅骨凹陷骨折,疗效和安全性均较好,对于邻近前囟或骨缝的凹陷骨折,可以通过前囟外侧角或未闭合的骨缝撬起凹陷,这一术式更为微创。然而,本研究存在一定的局限性,病例数太少,且未与保守治疗或产科负压吸引器治疗进行对比分析,未来有待设计更合理的临床试验、增加病例数、延长随访时间和增加客观评价指标,以期为新生儿颅骨凹陷骨折提供更适宜的手术方式。

利益冲突 无

## 参 考 文 献

- [1] Amin AA, Al-Zeky AM, El-Azm M. Vacuum extraction as a treatment modality of neonatal skull depression in a twin infant [J]. Saudi Med J, 2007, 28:1122-1124.
- [2] Yu L, Yu T, Hu JG. Non-surgical therapy on skull simple depressed fractures in neonate [J]. Zhonghua Xiao Er Wai Ke Za Zhi, 2012, 33:881-885. [余雷, 余腾, 胡家高. 新生儿单纯颅骨凹陷骨折的非手术治疗 [J]. 中华小儿外科杂志, 2012, 33: 881-885.]
- [3] Rehm A, Promod P, Ogilvy-Stuart A. Neonatal birth fractures: a retrospective tertiary maternity hospital review [J]. J Obstet Gynaecol, 2020, 40:485-490.
- [4] Wang HW, Lu LH, Zhu XP. An analysis of 22 cases with neonatal skull fracture [J]. Jiangsu Yi Yao, 2021, 47:234-237. [王华伟, 陆良华, 朱雪萍. 新生儿颅骨骨折22例分析 [J]. 江苏医药, 2021, 47:234-237.]
- [5] Tayeh C, Bali B, Milad N, Najjar M. Congenital depression of the skull in a neonate [J]. BMJ Case Rep, 2016:bc2016215437.
- [6] Zalatimo O, Ranasinghe M, Dias M, Iantosca M. Treatment of depressed skull fractures in neonates using percutaneous microscrew elevation [J]. J Neurosurg Pediatr, 2012, 9:676-679.
- [7] Xue XD. Pediatrics [M]. 2nd ed. Beijing: People's Medical Publishing House, 2010: 5. [薛辛东. 儿科学 [M]. 2版. 北京: 人民卫生出版社, 2010: 5.]

- [8] Zhang JZ. Pediatric trauma surgery [M]. Hangzhou: Zhejiang Science and Technology Publishing House, 2006: 66. [张金哲. 小儿创伤外科学 [M]. 杭州: 浙江科学技术出版社, 2006: 66.]
- [9] El Damaty A, Jurgowski D, Unterberg A. Closed reduction of ping-pong fracture in a neonate [J]. World Neurosurg, 2020, 139:377.
- [10] Shao X, Qin R, Sun MT. A case of depressed skull fracture in the neonate [J]. Zhongguo Yi Yao Ke Xue, 2024, 14:185-187. [邵珣, 秦蓉, 孙梦婷. 新生儿颅骨凹陷性骨折 1 例 [J]. 中国医药科学, 2024, 14:185-187.]
- [11] Neto CDRL, Coelho G, Figueiredo EG. A new device to treat ping-pong skull fractures: the hammer puller technique. A comparative analysis using a realistic simulation model [J]. Surg Neurol Int, 2024, 15:180.
- [12] Martinez EL, Welscher A, Shah MN, Sandberg DI. Elevation of depressed skull fracture in neonates using a breast pump and a custom-molded flange [J]. Oper Neurosurg (Hagerstown), 2024, 27:114-119.
- [13] Agrawal SK, Kumar P, Sundaram V. Congenital depression of the skull in neonate: a case of successful conservative management [J]. J Child Neurol, 2010, 25:387-389.
- [14] Mastrapa TL, Fernandez LA, Alvarez MD, Storrs BB, Flores-Urueta A. Depressed skull fracture in Ping Pong: elevation with Medeva extractor [J]. Childs Nerv Syst, 2007, 23:787-790.
- [15] Shi W, Xue P, Zhao R, Li H. Experience in the treatment of skull depression fracture in neonates [J]. Zhonghua Shen Jing Wai Ke Za Zhi, 2020, 36:570-573. [施伟, 薛萍, 赵瑞, 李昊. 新生儿颅骨凹陷性骨折的治疗体会 [J]. 中华神经外科杂志, 2020, 36:570-573.]
- [16] Preston D, Jackson S, Gandhi S. Non-traumatic depressed skull fracture in a neonate or 'ping pong' fracture [J]. BMJ Case Rep, 2015:bcr2014207077.
- [17] Hung KL, Liao HT, Huang JS. Rational management of simple depressed skull fractures in infants [J]. J Neurosurg, 2005, 103 (1 Suppl):69-72.
- [18] Flannigan C, O'Neill C. Faulty fetal packing [J]. BMJ Case Rep, 2011:bcr0220113802.
- [19] Gui LL, Lu W, Xing FZ, Xiao BD, Xiong XF, Yu L. Role of negative pressure suction for depressed skull fractures in neonates [J]. Zhonghua Xiao Er Wai Ke Za Zhi, 2019, 40:893-898. [桂琳玲, 鲁巍, 邢福中, 肖必栋, 熊晓峰, 余雷. 新生儿颅骨凹陷性骨折负压抽吸术治疗方法的研究 [J]. 中华小儿外科杂志, 2019, 40:893-898.]
- [20] Li J, Song K, Li RZ, Ye QS, Kou JJ. Fetal head aspirator in restoration of neonatal large area depressed skull fracture: report of one case and literature review [J]. Lin Chuang Shen Jing Wai Ke Za Zhi, 2024, 21:477-480. [李杰, 宋凯, 李汝珍, 叶庆寿, 寇军军. 胎头吸引器复位新生儿颅骨大面积凹陷性骨折 1 例并文献复习 [J]. 临床神经外科杂志, 2024, 21:477-480.]
- [21] Johnston JM, Park TS. Depressed skull fracture [J]. J Neurosurg, 2006, 105(6 Suppl):515-516.
- [22] Sun N, Zhang QJ, Zhan JH, Ma X, Wei ZN. Clinical explorations of skull depression in neonates [J]. Lin Chuang Xiao Er Wai Ke Za Zhi, 2017, 16:496-498. [孙宁, 张庆江, 詹江华, 马骁, 魏中南. 新生儿颅骨凹陷骨折治疗方法的探讨 [J]. 临床小儿外科杂志, 2017, 16:496-498.]

(收稿日期: 2024-09-03)

(本文编辑: 彭一帆)

doi:10.3969/j.issn.1672-6731.2024.10.015

· 读者 · 作者 · 编者 ·

## 更正: 儿童垂体腺瘤诊断与治疗进展

### Erratum to Progress on diagnosis and treatment of pituitary adenoma in children

特申请将《中国现代神经疾病杂志》2024 年第 24 卷第 9 期刊出的“儿童垂体腺瘤诊断与治疗进展”<sup>[1]</sup>一文中部分术语描述进行更正: 第 718 页左栏第 24 行、右栏第 9 行“甲状腺腺瘤”改为“促甲状腺素瘤”。第 720 页右栏第 4 行、第 13 行、第 18 行和第 20 行“甲状腺腺瘤”改为“促甲状腺素瘤”。

#### 参考文献

- [1] Wang CW, Du GR, Wang YZ, Zhu SL, Zhang B, Gong J. Progress on diagnosis and treatment of pituitary adenoma in children [J]. Zhongguo Xian Dai Shen Jing Ji Bing Za Zhi, 2024, 24:717-722. [王传伟, 杜国然, 王延召, 祝绍磊, 张斌, 宫杰. 儿童垂体腺瘤诊断与治疗进展 [J]. 中国现代神经疾病杂志, 2024, 24:717-722.]

山东大学齐鲁医院神经外科 王传伟