



Case report

Secondary closure of large omphalocele using component separation technique: A pediatric case report

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ABSTRACT

Introduction and importance: Component separation technique is utilized in adults to repair large abdominal wall defects but rarely used in children. We report a successfully performed component separation technique in a child after neonatal Gross closure for large omphalocele without biologic mesh placement.

Case presentation: A 6-year-old girl was treated at the age of 4 days for omphalocele type 2 according to Gross technique. She reconsulted six years later. Clinical examination showed a large eventration measuring 150 * 100 mm. CT scan revealed a broad collar of 150 mm and a large pocket containing liver, transverse colon, stomach and part of the small intestine. The child was proposed for a cure of the eventration using synthetic mesh type GORTEX. Intraoperatively, releasing bowel adhesions with abdominal wall resulted in perforation of the small intestine. Faced with the inability to use the mesh we resorted to abdominal closure with component separation technique. The postoperative was simple without complications or recurrence of the eventration. Follow up was of 4 years.

Clinical discussion: Staged surgical closure and non-operative delayed closure are the two distinct strategies for managing giant omphaloceles. By providing closure with less intra-abdominal pressure, the Component separation technique is a procedure which can be used in the two strategies. It may minimize the complications associated with large omphalocele management.

Conclusion: Faced with the impossibility of using a mesh, the component separation technique must be recognized as part of the therapeutic arsenal for secondary closure in children with a giant omphalocele.

1. Introduction

Surgical repair of giant omphalocele can be challenging. Despite the numerous methods of closure, indecision persists regarding the most successful alternative. Component separation technique is mainly performed in adults to repair large abdominal wall defects but infrequently in children [1,2]. The purpose of this report is to describe a successfully performed component separation technique in a child after neonatal Gross closure for large omphalocele without biologic mesh placement. This study has been reported in line with SCARE 2020 Checklist Criteria [3].

2. Case presentation

A 6-year-old girl was treated at the age of 4 days for giant omphalocele according to Gross technique. The size of the defect was superior to 5 cm, and the sac contained major part of the liver. Post-operatively

she was lost of sight. She consulted our department of pediatric surgery six years later with a large eventration measuring 150 * 100 mm (Fig. 1).

CT scan (Fig. 2) revealed a dehiscence of abdominal muscles extending from the metasternum to the hypogastric region realizing a broad collar of 150 mm and a large pocket containing liver, transverse colon, stomach and part of the small intestine. The abdominal wall muscles were present and with symmetrical appearance.

The child was proposed for a cure of the evisceration using synthetic mesh.

Intraoperatively, releasing bowel adhesions with abdominal wall resulted in deperitonisation of the right colon and perforation of the small intestine. Intestinal resection with immediate anastomosis between small intestine and transverse colon has been achieved making the use of mesh impossible. We opted then for component separation technique.

Once the rectus abdominis muscle is recognized, skin flap was created by dissecting the skin and subcutaneous fat free from the

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anterior rectal sheath and the aponeurosis of the external oblique muscle to 2 cm beyond the edge of the rectus sheath. An incision of external oblique muscle aponeurosis is made about 1 cm laterally of the rectus abdominis muscle. The layer between external oblique and internal oblique muscles is directly divided in the avascular plane. These steps were repeated on the contra-lateral side. The fascia was closed with slowly absorbable suture material by reapproximating the left rectus-internal oblique-transversus and the right rectus-internal oblique-transversus muscles. Two subcutaneous drains were placed to prevent seroma. Finally, the skin was closed with interrupted sutures. The closure was done without tension and the patient showed no signs of compartment syndrome.

The postoperative course was simple without recurrence. Follow up was of 4 years (Fig. 3).

3. Clinical discussion

The component separation technique is a safe one-stage procedure for secondary closure in children with a giant omphalocele without the need for prosthetic material and with good clinical outcome [4,5]. In low resource settings, where a mesh may not be available, or in situations where the use of the mesh is impossible as was the case for our patient, this technique is the solution for this type of omphalocele. Definition of giant omphaloceles remains controversial, however most

surgeons describe them as 5 cm or larger in diameter [4,6,7]. The dimension of the defect, pulmonary insufficiency, and the associated anomalies condition their management [8,9].

There are two distinct strategies for managing giant omphaloceles: Staged surgical closure, defined as abdominal tissue closure after multiple operations, and nonoperative delayed closure, defined as abdominal tissue closure by epithelialization of the sac. The efficiency of different techniques remains a matter of debate. Both strategies allow for a more controlled reduction of the omphalocele without life-threatening cardiopulmonary complications.

In resource-poor country similar to our settings, most of the patients belong to remote peripheral areas with inadequately equipped health centers. Usually the sac membrane became infected due to lack of dressing materials and adequate care of the newborn at periphery. The thickened and infected membrane develops dense adhesion with gut wall and viscera leading to fatal complications during surgery. This is why we prefer the technique of gross which proved less risk of infection and less morbidity [10].

The Component separation technique, first described by Ramirez [11], is a procedure which can be used in the two strategies. In this procedure, the abdominal wall muscular corset is formed by overlapping of muscle layers, which can be separated while maintaining their innervation and vascular supply. Since its inception, Component separation technique has evolved with the introduction of synthetic



Fig. 1. Pre-operative clinical examination.

materials for attaining coverage of the viscera.

The utility of component separation technique has been accepted in cases of large ventral hernias in adults. The application to congenital and acquired defects in pediatric patients has been reported. Among the 25 cases reported in the literature, 13 patients benefited from this technique as primary closure procedure [2,4,12,13]. The use of a mesh has been reported in 10 cases [2,14,15]; however, as our case shows, we can do without it for defects up to 15 cm.

Our pediatric patient illustrates the safety and feasibility of this technique in children without any complication.

Management of giant omphalocele remains a challenge for pediatric surgeons because of a high degree of viscera-abdominal disproportion, and a large abdominal wall defect. We describe in this article the application of the component separation technique without biologic mesh placement in children in a developing country. Enlargement of the use of this technique to neonate will lead us to attempt the ultimate goal of primary closure of the abdominal wall defect in the treatment of giant omphalocele. We have not acknowledged any evidence of early recurrence, but further follow up is required to evaluate long term durability.

4. Conclusion

Component separation technique is a useful and feasible procedure for closure of large abdominal wall defect in children especially after omphalocele Gross closure without biologic mesh placement.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

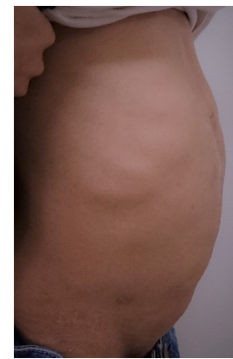


Fig. 3. Post-operative aspect.

Research registration number

N/A.

Ethical approval

N/A. This study is exempt from ethical approval from the institution.

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Guarantor

Yosra Kerkeni.

Submission declaration and verification

The authors declare that the work described has not been published previously, that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English

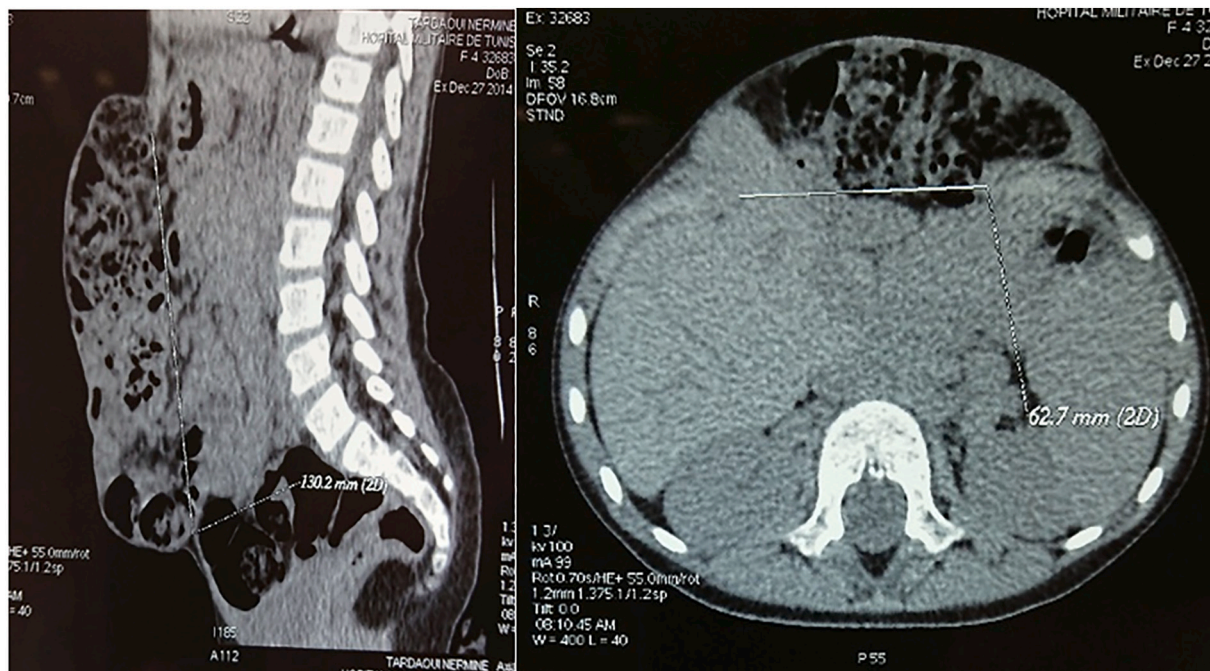


Fig. 2. CT scan: defect of abdominal muscles extending from the metasternum to the hypogastric region realizing a broad collar of 150 mm.

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Credit authorship contribution statement

YK: Drafted the article. FT: Acquisition of data. SH and AZ performed perioperative management of the patient. RJ: Supervision and Final approval of the version to be submitted.

Declaration of competing interest

N/A.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijscr.2022.107263>.

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