Research Article
E-ISSN : 3048-1368

Volume 06, Issue No. 01. 2024
P-ISSN : 3048-1376

The International Journal of Medical Science and Health Research



The Analysis Study of Diagnosis and Management of Giant Omphaloceles: A Comprehensive Systematic Review

[1] Risko Sandy, [2] I Gusti Agung Ngurah Maha Yudha, [3] I Made Darmajaya

[1] General Practitioner, Bintang Amin General Hospital, Bandar Lampung City, Lampung, Indonesia
[2] General Practitioner, Mukomuko Regional General Hospital, Mukomuko Regency, Bengkulu, Indonesia
[3] Pediatric Surgery Consultant, Division of Pediatric Surgery, Departement of Surgery, Faculty of Medicine, Udayana University / Prof. IGNG Ngoerah Central General Hospital, Denpasar, Bali, Indonesia
Correspondence : riskosandy151297@gmail.com

Article History :
Received date : 2024/08/12
Revised date : 2024/09/19
Accepted date : 2024/10/22
Published date : 2024/11/13

Copyright: *© 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (BY NC) license (https://creativecommons.org/licenses/by-nc/4.0/).*

E-ISSN :
ISSN 3048-1368
9 773048 136000

P-ISSN :
ISSN 3048-1376
9 773048 137007

ABSTRACT

Background: Giant omphalocele (GO) is a severe form of omphalocele, characterized by a defect larger than 5 cm, often including the liver. Management strategies include staged surgical closure and non-operative delayed closure, with the latter focusing on neo-epithelialization and secondary operations. This study aims to explore diagnosis and management during neonatal care. **Methods:** This systematic review exclusively examined full-text articles published in English between 2014 and 2024, adhering to the PRISMA 2020 guidelines. **Result:** The study conducted a thorough review of more than 300 publications that were obtained from reputable databases, such as ScienceDirect, SagePub, and PubMed. Eight publications were identified as necessitating a more comprehensive examination subsequent to an initial screening. As a result, a comprehensive review of these selected studies was conducted to guarantee an exhaustive and rigorous assessment. **Conclusion:** Giant omphaloceles management involves a multifaceted approach, including primary closure, staged surgical closure, and nonoperative delayed closure. Synthetic materials and biological meshes promote granulation tissue formation and gradual closure, but further research is needed to reduce morbidity and mortality.

Keywords: giant omphalocele, management, morbidity, mortality.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

INTRODUCTION

Omphalocele is a congenital malformation characterized by the persistence of the physiological herniation of the midgut, leading to a defect in the abdominal wall. The size and contents of the hernial sac can vary, ranging from small defects containing only hollow organs to larger ones that may include solid organs. The prevalence of omphalocele is between 1 to 3.8 per 10,000 live births.[1,2] Up to 80% of affected patients present with associated malformations, most frequently cardiovascular defects, complicating the management and increasing the challenges in treating these patients.[3]

A particularly severe form of omphalocele, known as giant omphalocele (GO), is distinguished by a defect larger than 5 cm and often includes the liver within the hernial sac, resulting in significant visceroabdominal disproportion.[4] This condition is frequently accompanied by pulmonary hypoplasia, which considerably elevates neonatal morbidity and mortality rates, especially when other anomalies are present.[5,6] The complexity of GO requires careful consideration in management strategies, as the combination of organ malformations and pulmonary complications presents a significant challenge in neonatal care.

There are two primary approaches to managing giant omphalocele: staged surgical closure and non-operative delayed closure. Both strategies have been employed based on individual clinical presentations, patient comorbidities, and surgeon preference, but no consensus has been established.[7,8] Non-operative management aims to promote neo-epithelialization of the sac using topical agents, such as silver sulfadiazine, povidone-iodine, and silver nitrate, to minimize infection risk before definitive closure. In staged surgical closures, techniques like the use of Silastic silos, tissue expanders, and synthetic mesh are employed, followed by secondary operations to close the abdominal wall.[9,10] This study aims to further

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

explore the diagnosis and management of patients with giant omphalocele during the critical neonatal period.

METHODS

Protocol

The study was conducted with strict adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines, ensuring a high standard of methodological rigor. By following PRISMA 2020, the review process was structured to be transparent, reproducible, and scientifically robust. This approach involved the systematic execution of each stage, including literature search, data extraction, and synthesis of findings, all with the aim of minimizing bias. These careful procedures not only enhanced the reliability of the review but also strengthened the credibility of the conclusions drawn, ensuring that the findings were grounded in solid, evidence-based practices.

Criteria for Eligibility

This study aims to deepen the understanding of the diagnosis and management of giant omphalocele during the critical neonatal period. Through a systematic review and synthesis of data from a diverse range of studies, it seeks to identify emerging trends and inform the development of more effective strategies for patient care. The primary objective is to extract key themes from the academic literature that can enhance the clinical approach to managing giant omphalocele, ultimately improving outcomes for affected neonates.

To ensure analytical rigor, the study applied stringent inclusion and exclusion criteria. Only peer-reviewed studies published in English between 2014 and 2024, with a verifiable DOI, were included to ensure authenticity and relevance. Non-research documents, such as reviews, editorials, and duplicate entries, were excluded to maintain the precision and integrity of the dataset. This selective process guarantees that the findings are based on high-quality, relevant sources, ensuring a reliable analysis.

By employing this meticulous methodology, the study ensures that

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

the data used are both robust and reliable, providing a solid foundation for drawing actionable conclusions. These insights are expected to contribute meaningfully to advancements in clinical practice, enhancing the management and care of neonates with giant omphalocele.

Search Strategy

We used "diagnosis OR management OR therapy OR giant omphaloceles" as keywords. The search for studies to be included in the systematic review was carried out using the PubMed, SagePub, and Sciencedirect databases.

Data retrieval

The authors conducted a thorough preliminary review of each article by carefully examining the titles and abstracts to determine their relevance before proceeding to a more in-depth evaluation. Only studies that aligned with the research objectives and satisfied the predetermined inclusion criteria were selected for further analysis. This approach facilitated the identification of consistent and meaningful patterns within the literature.

To ensure uniformity, only full-text articles published in English were considered, maintaining consistency in the language of the selected studies. A rigorous screening process was applied to ensure that all included content directly addressed the study's focus and adhered to the established inclusion criteria. Studies that did not meet these criteria were systematically excluded from further consideration and were not incorporated into the final analysis.

The evaluation process considered a broad range of factors, including study titles, authors, publication dates, research locations, and methodologies. This comprehensive approach ensured that only the most relevant and high-quality content was included in the analysis, thereby strengthening the reliability and rigor of the study's conclusions.

Quality Assessment and Data Synthesis

The authors conducted a meticulous initial screening by carefully reviewing each article's title and abstract to identify studies that warranted further consideration.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

Those that met the relevance criteria during this preliminary evaluation were then subjected to a comprehensive, in-depth review. This thorough examination ensured that only the most relevant and significant studies were selected for detailed analysis. By employing such a rigorous approach, the selection process was refined, enabling a more focused and nuanced assessment of the existing research and its broader contextual significance.

Table 1. Search Strategy

Database	**Search Strategy**	***Hits***
Pubmed	*("therapy" OR "management" AND "diagnosis" AND "giant omphaloceles")*	14
Science Direct	*("therapy" OR "management" AND "diagnosis" AND "giant omphaloceles")*	305
Sagepub	*("therapy" AND "management" AND "diagnosis" AND "giant omphaloceles")*	3

.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

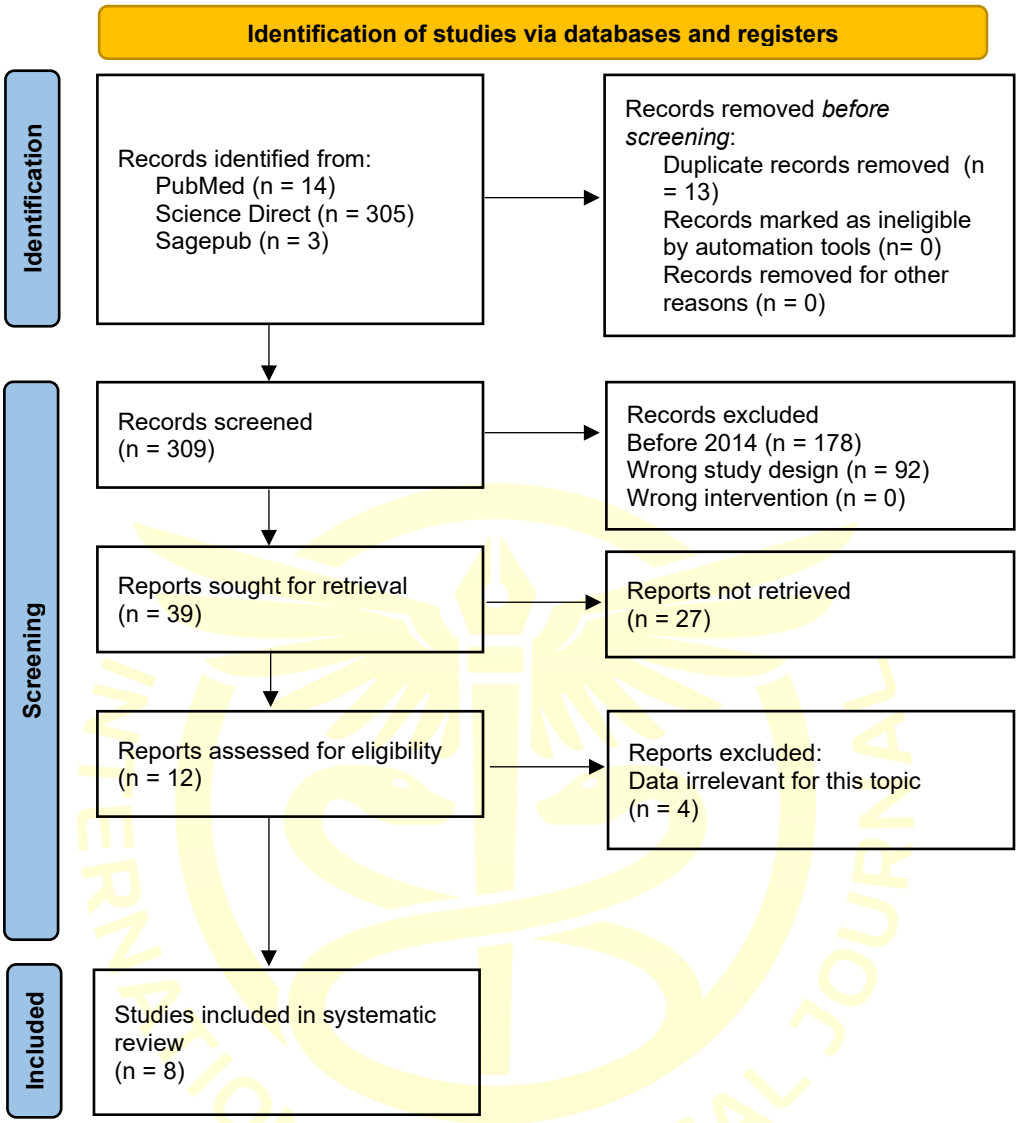


Figure 1. Article search flow chart

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

Table 2. Critical appraisal of Study

Parameters	(Oquendo et al., 2015)	(Bauman et al., 2016)	(Kruit et al., 2016)	(Percy et al., 2018)	(Dorterler, M, 2019)	(Wagner & Cusick, 2019)	(Abello et al., 2021)	(Rombaldi et al., 2023)
1. Bias related to temporal precedence								
Is it clear in the study what is the "cause" and what is the "effect" (ie, there is no confusion about which variable comes first)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Bias related to selection and allocation								
Was there a control group?	No	No	No	No	No	No	No	No
3. Bias related to confounding factors								
Were participants included in any comparisons similar?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
4. Bias related to administration of intervention/exposure								
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes.	No.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
5. Bias related to assessment, detection, and measurement of the outcome								
Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	No	No	No	No	No	No	No	No
Were the outcomes of participants included in any comparisons measured in the same way?	No	Yes	No	No	No	No	No	No
Were outcomes measured in a reliable way?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
6. Bias related to participant retention								
Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	No	No	Yes	Yes	Yes	No	No	No
7. Statistical conclusion validity								
Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

RESULT

Our investigation commenced with a systematic collection of articles from reputable databases, including ScienceDirect, PubMed, and SagePub. After applying a rigorous three-stage screening process, we identified and selected eight studies that were most relevant to our systematic review. These selected papers were then subjected to an in-depth analysis, with key topics highlighted for further detailed examination. To enhance clarity and ensure a streamlined presentation of our findings, a concise summary of the analyzed data is provided in Table 3.

Table 3. The literature included in this study

Author	Origin	Method	Sample	Result
Oquendo et al.[10] (2015)	USA	Retrospective Study	8 participants	A study involved five patients with GO, with the infant's gestation age, weight, and maternal age being 28 ± 5.3 years, 34 ± 4 weeks, and 2.5 ± 0.62 kg. The GO size was 11 cm in length and 11 cm in width. The pre-operative hospitalization days were 78 ± 74 days, with two neonates requiring tracheostomy and home ventilation. The average follow-up was 37 ± 27 months, with no treatment-associated morbidities.
Bauman et al.[7] (2016)	USA	Systematic Review	14 studies	The management of giant omphaloceles involves various methods, with topical therapy often used as a secondary treatment. Primary nonoperative delayed management has a higher cumulative mortality rate, and the time to initiation of full enteric feedings is shorter in nonoperative delayed management.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

Kruit et al.[11] (2016)	Netherlands	Case Series	3 cases	Giant omphalocele is a rare abdominal wall defect where intra-abdominal organs herniate through the umbilical cord, covered by a sac. Surgical management is challenging, and treatment options include staged closure and delayed closure. Delayed closure involves conservative treatment promoting sac epithelialization, with three patients treated using a delayed closure technique for ventral hernia repair.
Percy et al.[12] (2018)	Canada	Retrospective Study	5 participants	Between 2014 and 2016, five patients with GO were treated with SI dressings, focusing on clinical characteristics such as gestational age, birth weight, GO size, ventilator days, days in NICU, days to full feeds, and LOS. The average in-hospital cost was $110 CAD/week, comparable to daily silver sulfadiazine dressings. All patients were discharged with dressing changes, and one mortality occurred due to pulmonary sepsis.
Dorterler, Mustafa[13] (2019)	China	Observational Study	22 participants	The study evaluated 14 patients with giant omphalocele (GO) defects, with a mean duration of 11 days of conservative monitoring and 35 hospital stays. After seven patients died in the first week, 15 patients received conservative and elastic bandages for 9-14 days. After 11 days of GO

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

				treatment, patients were hospitalized for 24 days postoperatively.
Wagner & Cusick[14] (2019)	USA	Review	-	The treatment strategy for large defects and severe comorbidities involves escharification and skin coverage over the viscera, using principles from the early 20th century. This review explores the history, principles, methods, and outcomes of the 'paint and wait' management of omphalocele.
Abello et al.[15] (2021)	Colombia	Retrospective Study	40 participants	A nonsurgical silo technique was used to manage 40 patients, 21 of whom were female, with an average weight of 2900 gs and 38 weeks gestational age. The technique achieved anatomical closure in 95% of cases, with 4 patients using absorbable mesh and 2 requiring dualmesh. No mortality was associated.
Rombaldi et al.[16] (2023)	Brazil	Prospective Study	2 participants	Patients awaiting surgery underwent minimal manipulation, mechanical ventilation, full enteral feeding, and contact with parents. The midline was approximated without tension or prosthesis use, and patients were discharged with repaired defects.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

DISCUSSION

The management of giant omphaloceles (GO) is primarily influenced by the size of the abdominal wall defect, the degree of pulmonary insufficiency, and the presence of associated anomalies. The primary goal of treatment is tissue closure, but achieving this is complicated by the extent of visceroabdominal disproportion. Approximately 30% to 50% of omphaloceles are candidates for primary closure, which is more feasible for smaller defects. However, in cases of giant omphaloceles with significant visceroabdominal disproportion, primary closure is often not viable, requiring alternative strategies. The severity of the condition, particularly in GO, necessitates a careful selection of treatment approaches to optimize outcomes and minimize complications.[17]

Primary closure, defined as closing the defect in a single operation, is typically reserved for small to medium-sized omphaloceles.[18,19] This procedure involves early approximation of the umbilical fascial tissue and resection of the omphalocele sac. However, for giant omphaloceles, primary closure is rarely possible without the use of synthetic mesh grafts.[19] Despite its advantages, such as immediate closure, primary closure in GO presents significant risks, including abdominal compartment syndrome, which can lead to severe complications like respiratory distress, hemodynamic instability, and renal failure.[20-23] Additionally, postoperative herniation rates are high, with primary closure associated with a 58% rate of herniation, as reported by Eijck et al. This highlights the limitations of primary closure in managing giant omphaloceles, prompting the need for alternative strategies.[19]

Staged surgical closure offers a safer alternative to primary closure, especially for cases involving large tissue defects and extensive visceroabdominal disproportion. This approach involves multiple procedures over time, allowing gradual reduction of the viscera and eventual abdominal wall closure

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

without causing a sudden increase in intraabdominal pressure.[19] Techniques such as skin flap creation, silo construction, and the use of synthetic materials like Silastic and Dacron sacks have been employed to manage the viscera before final closure.[24,25] Although staged closure reduces the risk of immediate complications like abdominal compartment syndrome, it carries its risks, including wound infections, dehiscence, and delayed introduction of enteral feeding. These complications underscore the importance of carefully balancing the timing and method of closure to optimize outcomes.

In recent years, synthetic materials and biological meshes have become integral to the management of giant omphaloceles, especially when the omphalocele sac ruptures or when traditional closure methods fail. Synthetic materials like AlloDerm, a biologic decellularized human skin, have gained popularity due to their lower risk of infection and the avoidance of additional operations for mesh removal.[21,26,27] This innovation has improved outcomes for many infants by promoting granulation tissue formation and facilitating gradual closure of the defect. However, the use of these materials still requires careful monitoring for potential complications, such as infection or mesh dehiscence, and further research is needed to refine these approaches and reduce associated risks.

Nonoperative delayed closure remains an important option for infants with giant omphaloceles, particularly when staged surgical approaches are not feasible due to extreme visceroabdominal disproportion. Topical treatments, such as Betadine and Silvadene, have been used to promote neo-epithelialization of the omphalocele sac, gradually resolving the disproportion over several months.[28] These approaches allow the infant's abdominal cavity to grow, making eventual fascial closure more tolerable. Although nonoperative delayed closure offers advantages such as shorter hospital stays, earlier initiation of full feeding, and lower sepsis rates compared to staged surgical closure, it is not without its

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

challenges.[24,25] The inability to explore the abdomen for congenital anomalies early on and the potential for systemic toxicities from topical agents are notable drawbacks.[20,29] Nevertheless, this method has been associated with fewer long-term complications and may lead to better neurodevelopmental outcomes in the long run.[30]

Therefore, the management of giant omphaloceles requires a multifaceted approach tailored to the individual needs of the patient. While primary closure may be ideal for smaller defects, it is rarely suitable for giant omphaloceles due to the risk of severe complications. Staged surgical closure and nonoperative delayed closure offer safer alternatives, with each approach carrying its own set of benefits and risks. Advances in synthetic and biological materials, as well as evolving techniques, have improved outcomes, but further research is needed to refine these strategies and reduce the associated morbidity and mortality. Moreover, studies are needed to assess the long-term impacts of these management approaches on neurodevelopment, as early interventions and reduced complications may play a critical role in improving the quality of life for these infants

CONSCLUSION

Giant omphaloceles management involves a multifaceted approach tailored to individual patient needs. Primary closure, which is ideal for smaller defects, is often not viable for cases with significant visceroabdominal disproportion. Staged surgical closure and nonoperative delayed closure offer safer alternatives, but each has its own set of benefits and risks. Synthetic materials and biological meshes have become integral to the management of giant omphaloceles, promoting granulation tissue formation and gradual closure. However, further research is needed to refine these strategies and reduce associated morbidity and mortality. The long-term impacts of these management approaches on neurodevelopment are also crucial for improving the quality of life for these infants.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

DISCLOSURE STATEMENT

Disclosure Statement : The authors have no conflicts of Interest to declare.

REFERENCES

1. Stallings, E. B., Isenburg, J. L., Short, T. D., Heinke, D., Kirby, R. S., Romitti, P. A., Canfield, M. A., O'Leary, L. A., Liberman, R. F., Forestieri, N. E., Nembhard, W. N., Sandidge, T., Nestoridi, E., Salemi, J. L., Nance, A. E., Duckett, K., Ramirez, G. M., Shan, X., Shi, J., & Lupo, P. J. (2019). Population-based birth defects data in the United States, 2012-2016: A focus on abdominal wall defects. Birth defects research, 111(18), 1436–1447. https://doi.org/10.1002/bdr2.1607
2. Pechriggl, E., Blumer, M., Tubbs, R. S., Olewnik, Ł., Konschake, M., Fortélny, R., Stofferin, H., Honis, H. R., Quinones, S., Maranillo, E., & Sanudo, J. (2022). Embryology of the Abdominal Wall and Associated Malformations-A Review. Frontiers in surgery, 9, 891896. https://doi.org/10.3389/fsurg.2022.891896
3. Fogelström, A., Caldeman, C., Oddsberg, J., Löf Granström, A., & Mesas Burgos, C. (2021). Omphalocele: national current birth prevalence and survival. Pediatric surgery international, 37(11), 1515–1520. https://doi.org/10.1007/s00383-021-04978-z
4. Rombaldi, M. C., Barreto, C. G., Peterson, C. A., Cavazzola, L. T., Santis-Isolan, P. M. B., & Fraga, J. C. (2021). Complex ventral hernia repair in a child: An association of botulinum toxin, progressive pneumoperitoneum and negative pressure therapy. A case report on an arising

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

surgical technique. International journal of surgery case reports, 81, 105828. https://doi.org/10.1016/j.ijscr.2021.105828

5. Baerg, J. E., & Munoz, A. N. (2019). Long term complications and outcomes in omphalocele. Seminars in pediatric surgery, 28(2), 118–121. https://doi.org/10.1053/j.sempedsurg.2019.04.004
6. Raymond, S. L., Downard, C. D., St Peter, S. D., Baerg, J., Qureshi, F. G., Bruch, S. W., Danielson, P. D., Renaud, E., & Islam, S. (2019). Outcomes in omphalocele correlate with size of defect. Journal of pediatric surgery, 54(8), 1546–1550. https://doi.org/10.1016/j.jpedsurg.2018.10.047
7. Bauman, B., Stephens, D., Gershone, H., Bongiorno, C., Osterholm, E., Acton, R., Hess, D., Saltzman, D., & Segura, B. (2016). Management of giant omphaloceles: A systematic review of methods of staged surgical vs. nonoperative delayed closure. Journal of pediatric surgery, 51(10), 1725–1730. https://doi.org/10.1016/j.jpedsurg.2016.07.006
8. Barrios Sanjuanelo, A., Abelló Munarriz, C., & Cardona-Arias, J. A. (2021). Systematic review of mortality associated with neonatal primary staged closure of giant omphalocele. Journal of pediatric surgery, 56(4), 678–685. https://doi.org/10.1016/j.jpedsurg.2020.08.019
9. Hatch, E. I., Jr, & Baxter, R. (1987). Surgical options in the management of large omphaloceles. American journal of surgery, 153(5), 449–452. https://doi.org/10.1016/0002-9610(87)90791-4

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

10. Oquendo, M., Agrawal, V., Reyna, R., Patel, H. I., Emran, M. A., & Almond, P. S. (2015). Silver-impregnated hydrofiber dressing followed by delayed surgical closure for management of infants born with giant omphaloceles. Journal of pediatric surgery, 50(10), 1668–1672. https://doi.org/10.1016/j.jpedsurg.2015.06.011
11. Kruit, A. S., Al-Ani, S. A., Jester, I., & Jester, A. (2016). Multilayered Flap Technique: A Method for Delayed Closure of Giant Omphalocele. Annals of plastic surgery, 76(6), 680–683. https://doi.org/10.1097/SAP.0000000000000589
12. Percy, D. B., Haddock, C., Ma, V., Nowak, A., Panczuk, J., & Butterworth, S. (2018). Dressed for success? Silver impregnated nanocrystalline dressing for initial treatment of giant omphalocele. Journal of pediatric surgery, 53(5), 905–908. https://doi.org/10.1016/j.jpedsurg.2018.02.005
13. Dörterler M. E. (2019). Management of Giant Omphalocele Leading to Early Fascial Closure. Cureus, 11(10), e5932. https://doi.org/10.7759/cureus.5932
14. Wagner, J. P., & Cusick, R. A. (2019). Paint and wait management of giant omphaloceles. Seminars in pediatric surgery, 28(2), 95–100. https://doi.org/10.1053/j.sempedsurg.2019.04.005
15. Abello, C., A Harding, C., P Rios, A., & Guelfand, M. (2021). Management of giant omphalocele with a simple and efficient nonsurgical silo. Journal of pediatric surgery, 56(5), 1068–1075. https://doi.org/10.1016/j.jpedsurg.2020.12.003
16. Rombaldi, M. C., Barreto, C. G., Feldens, L., Holanda, F.,

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

Takamatu, E. E., Schopf, L., Peterson, C. A. H., Costa, E. C., Cavazzola, L. T., Isolan, P., & Fraga, J. C. (2023). Giant omphalocele: A novel approach for primary repair in the neonatal period using botulinum toxin. Revista do Colegio Brasileiro de Cirurgioes, 50, e20233582. https://doi.org/10.1590/0100-6991e-20233582-en

17. Pereira, R. M., Tatsuo, E. S., Simões e Silva, A. C., Guimarães, J. T., Paixão, R. M., Lanna, J. C., & Miranda, M. E. (2004). New method of surgical delayed closure of giant omphaloceles: Lazaro da Silva's technique. Journal of pediatric surgery, 39(7), 1111–1115. https://doi.org/10.1016/j.jpedsurg.2004.03.064
18. Grosfeld, J. L., & Weber, T. R. (1982). Congenital abdominal wall defects: gastroschisis and omphalocele. Current problems in surgery, 19(4), 157–213. https://doi.org/10.1016/0011-3840(82)90048-x
19. van Eijck, F. C., Aronson, D. A., Hoogeveen, Y. L., & Wijnen, R. M. (2011). Past and current surgical treatment of giant omphalocele: outcome of a questionnaire sent to authors. Journal of pediatric surgery, 46(3), 482–488. https://doi.org/10.1016/j.jpedsurg.2010.08.050
20. Lee, S. L., Beyer, T. D., Kim, S. S., Waldhausen, J. H., Healey, P. J., Sawin, R. S., & Ledbetter, D. J. (2006). Initial nonoperative management and delayed closure for treatment of giant omphaloceles. Journal of pediatric surgery, 41(11), 1846–1849. https://doi.org/10.1016/j.jpedsurg.2006.06.011
21. van Eijck, F. C., de Blaauw, I., Bleichrodt, R. P., Rieu, P.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

N., van der Staak, F. H., Wijnen, M. H., & Wijnen, R. M. (2008). Closure of giant omphaloceles by the abdominal wall component separation technique in infants. Journal of pediatric surgery, 43(1), 246–250. https://doi.org/10.1016/j.jpedsurg.2007.09.051

22. Ein, S. H., & Langer, J. C. (2012). Delayed management of giant omphalocele using silver sulfadiazine cream: an 18-year experience. Journal of pediatric surgery, 47(3), 494–500. https://doi.org/10.1016/j.jpedsurg.2011.08.014
23. Pandey, V., Gangopadhyay, A., Gupta, D., Sharma, S., & Kumar, V. Non-operative management of giant omphalocele with topical povidone-iodine and powdered antibiotic combination: Early experience from a tertiary centre. Pediatr Surg Int Pediatric Surgery International, (2014); 30, 407-411.
24. Pereira, R. M., Tatsuo, E. S., Simões e Silva, A. C., Guimarães, J. T., Paixão, R. M., Lanna, J. C., & Miranda, M. E. (2004). New method of surgical delayed closure of giant omphaloceles: Lazaro da Silva's technique. Journal of pediatric surgery, 39(7), 1111–1115. https://doi.org/10.1016/j.jpedsurg.2004.03.064
25. Kilbride, K. E., Cooney, D. R., & Custer, M. D. (2006). Vacuum-assisted closure: a new method for treating patients with giant omphalocele. Journal of pediatric surgery, 41(1), 212–215. https://doi.org/10.1016/j.jpedsurg.2005.10.003
26. Alaish, S. M., & Strauch, E. D. (2006). The use of Alloderm in the closure of a giant omphalocele. Journal of pediatric surgery, 41(3), e37–e39.

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved

https://doi.org/10.1016/j.jpedsurg.2005.12.067

27. Parida, L., Pal, K., Al Buainain, H., & Elshafei, H. (2014). Staged Closure of Giant Omphalocele using Synthetic Mesh. APSP journal of case reports, 5(3), 27.
28. Nuchtern, J. G., Baxter, R., & Hatch, E. I., Jr (1995). Nonoperative initial management versus silon chimney for treatment of giant omphalocele. Journal of pediatric surgery, 30(6), 771–776. https://doi.org/10.1016/0022-3468(95)90745-9
29. Baird, R., Gholoum, S., Laberge, J. M., & Puligandla, P. (2010). Management of a giant omphalocele with an external skin closure system. Journal of pediatric surgery, 45(7), E17–E20. https://doi.org/10.1016/j.jpedsurg.2010.05.004
30. Danzer, E., Gerdes, M., D'Agostino, J. A., Bernbaum, J., Hoffman, C., Rintoul, N. E., Herkert, L. M., Flake, A. W., Adzick, N. S., & Hedrick, H. L. (2015). Patient characteristics are important determinants of neurodevelopmental outcome during infancy in giant omphalocele. Early human development, 91(3), 187–193. https://doi.org/10.1016/j.earlhumdev.2014.12.009

Downloaded from theInternationalmedicaljournal.org. For personal use only. No other uses without permission.
Copyright © International Medical Journal Corp. Ltd. All rights reserved