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Successful Surgical Management of Neuroblastoma with Obstructed Inferior Vena Cava in Palestinian Infant

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Abstract

Neuroblastoma is the second most frequent retroperitoneal tumor in children, following Wilms' tumor. It is a solid tumor with a variety of outcomes, ranging from spontaneous regression to death. The most common clinical indications and symptoms of neuroblastoma are nausea, bloating, vomiting, and weight loss. To show an irregular, heterogeneous, capsulated, calcified mass and some arteries that are narrowed and obstructed, especially the inferior vena cava, that are linked to neuroblastoma, many imaging techniques are needed. In this article, we will discuss an unusual case of an 8-month-old child with a right-sided retroperitoneal solid mass and constricted inferior vena cava (IVC). It is great to do such surgeries in rural poor areas during wartime in occupied Palestine.

Keywords: Pediatrics; Neuroblastoma; IVC

Abbreviations: IVC: Inferior Vena Cava; CT: Computed Tomography

Background

Neuroblastoma is the second-most frequent retroperitoneal tumor in children. It is a neuroectodermal tumor that develops from the adrenal glands or the sympathetic nervous system [1]. It demonstrates that it is responsible for 15% of pediatric cancer deaths [2,3]. And it can show up as a simple case or with vessel encasement with or without luminal stenosis, which is a very bad complication that raises the risk of thromboembolic events and the IVC syndrome [1]. The lack of specificity in neuroblastoma presentation makes it a huge challenge in diagnosis and management.

Case Presentation

An 8-month-old Palestinian boy was examined by his family medicine doctor in his rural town and referred to our pediatric surgery department due to a huge palpable mass in his abdomen. which was noticed by his mother 3 months prior to presentation; the child was neglected, poor hygiene with depressed mother, there was poor appetite and bloating as the early symptoms. There was no family history of inherited disorders or congenital abnormalities, no allergy to drugs or food, and no previous operations. The baby was treated gas free by the mother alone with no improvement complete blood count was within normal, Serum metanephrines and blood metanephrines were both within the normal range. Normal levels of serum cortisol and aldosterone were observed too.

On examination, a palpable mass was identified on the right upper abdomen by his GP doctor and confirmed by the pediatric surgeon doctor as well. The mass was fixed, not mobile, solid, and hard. Ultrasonography imaging was ordered to show a mass measuring 14 cm in maximum diameter across the mid-abdomen. A computed tomography (CT) scan was done that showed a large calcified heterogeneous mass. It also showed stenosis of IVC (Figure 1).

Following an assessment of surgical risk and tumor respectability, a surgical intervention with tumor resection

was done, the surgery lasted for 150 minutes with blood loss of about 300 ml. A massive retroperitoneal tumor with an anterior displacement of the ascending colon was discovered in surgery. The right kidney, accompanying arteries, ureter, and IVC were all completely encased, necessitating a nephroureterectomy. The constricted portion of the IVC was observed from outside the tumor capsule to the distal end, which was devoid of tumor compression. Finally, tumor resection was done after dissecting it from the vascular plane of the IVC. The tumor was detached from the IVC's vascular plane, with only a small amount of tumor remaining on the vascular surface (Figure 2).

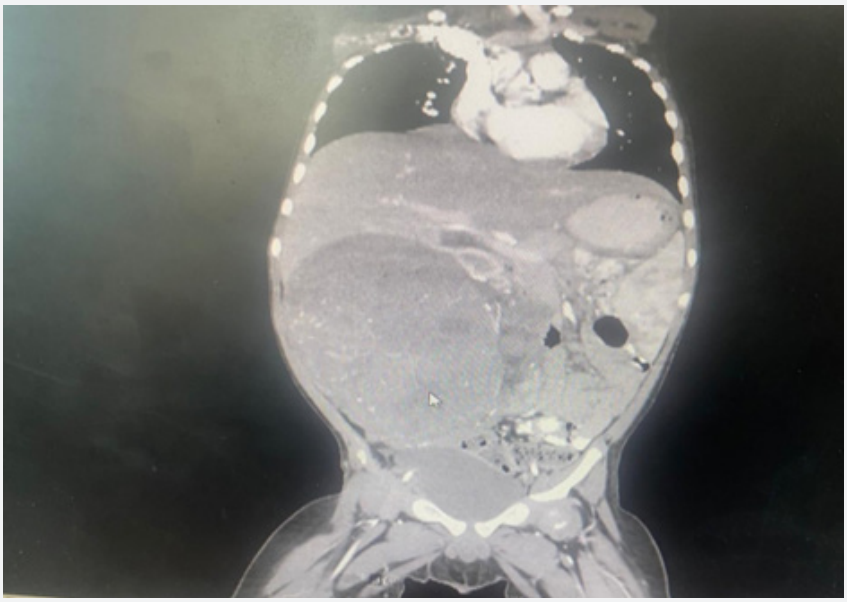

Figure 1: CT showing a huge heterogeneous mass (arrowed).

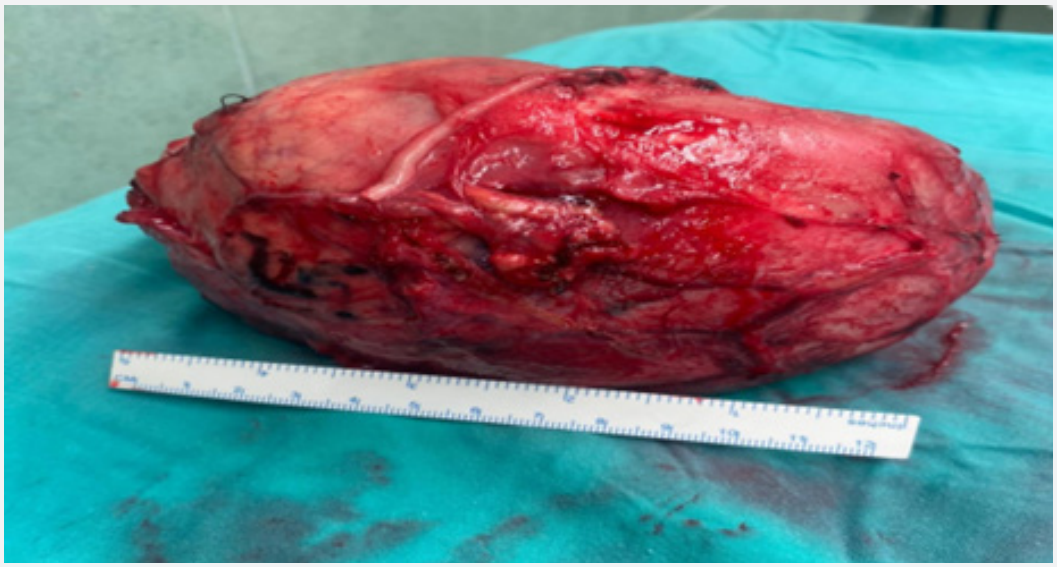

Figure 2: the mass post-operation.

Outcome

After the operation, the patient was reexamined and evaluated in the pediatric intensive care unit. The pathology report confirmed the diagnosis of neuroblastoma. After 10 days of observation, progressive healing and recovery were noted, and the patient was referred to the pediatric department for another 10 days. After six months of regular follow-up with the patient,

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there were no complications.

Discussion

Neuroblastoma consists of ganglioneuroblastoma, neuroblastomas, and ganglioneuroma; its incidence rate is 60% by the age of one year and 10% by the age of fourteen [4]. The manifestation of neuroblastoma in patients is contingent upon the specific site of the tumor, its extent of infiltration into nearby tissues, and its ability to spread to other parts of the body. The most frequent main locations of adult neuroblastoma are the head and neck area, the central nervous system, the abdominal cavity, and the chest. Approximately half of abdominal neuroblastomas originate from the adrenal gland [4,5]. The treatment of neuroblastoma necessitates a comprehensive strategy involving surgery, radiation, high-dose chemotherapy with stem cell rescue, and iodine-131-MIBG therapy [5]. The literature revealed a 5-year overall survival rate of 83% following a combination of treatment methods even though surgery is still the preferred therapy option [6].

Stenosis of the IVC is a vascular abnormality that can lead to life-threatening complications if not treated [7]. This unusual vascular abnormality may be congenital or the result of acquired circumstances such as tumor invasion, trauma, or surgery [8-10]. Congenital stenosis is defined by suprarenal constriction with or without web formation [10]. Depending on the amount of the stenosis, young patients with interrupted IVC or congenital stenosis may present with recurrent deep vein thrombosis and other thrombo-embolic events. However, in our situation, the patient was asymptomatic except for a huge palpable lump across the right upper quadrant of the abdomen. The intraoperative documentation revealed that the constricted portion of the IVC was at the infrarenal level. Furthermore, no evidence of external compression, encasement, or tumor invasion of this IVC segment was found. Vascular encasement with stenosis has been noted as a distinguishing hallmark of neuroblastoma, demonstrating the tumor's percolating and invasive nature [11]. This phenomenon is frequently aiding physicians in distinguishing the tumor from Wilms'. Some literature characterized distortion and elongation of major retroperitoneal arteries as one of the anatomical abnormalities observed in these tumors [12-14]. This reinforces our findings that retroperitoneal tumors have the ability to develop and grow until they damage the surrounding structures, causing organ and vessel distortion or elongation.

The surgical treatment of abdominal neuroblastoma with IVC encasement remains difficult. Dissecting the tumor from enclosed veins lengthens the surgical time and frequently results in vascular damage. This frequently discourages pediatric surgeons from doing surgeries after assessing the surgical risk. New research shows that kids with vascular-encased abdominal neuroblastoma do better when the tumor is completely removed or at least the size of the tumor is reduced, even if the blood vessels get hurt during surgery [15]. To avoid unfavorable results, surgeons should do a thorough preoperative examination in cases of vascular stenosis caused by tumor growth. However, there are some problems. For example, the narrowed part of the arteries that are affected might be hard to see on a contrast CT scan when there is a large, varied neuroblastoma in the background [16]. In such cases, an abdominal arteriogram or venogram may be recommended.

Conclusions

Neuroblastoma is a dangerous and difficult tumor; more research is needed to enhance quality of care and survival. Furthermore, numerous clinical investigations and randomized controlled trials are required to assess the role of procedures and the options available.

Scientific Responsibility Statement:

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement:

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Ethical Approval

ethical approval was obtained from the ethical committee of the Palestine polytechnic university and hospital No: KA/41/2024.

Consent

The authors obtained written informed consent from the patient mother and father for this case.

References

1. Boztug K, Kiely E, Roebuck D J, Mark Gaze, Joanna Begent, et al. (2006) Successful treatment of MYCN amplified, progressive stage 4S neuroblastoma in a neonate with hepatic artery embolization in addition to multimodality treatment. Pediatr Blood Cancer 46(2): 253-257.

2. Mahapatra S, Challagundla KB (2021) Neuroblastoma. In StatPearls; StatPearls Publishing: Treasure Island, FL, USA.

3. Cohn SL, Pearson ADJ, London WB, Monclair T, Ambros PF, et al. (2009) The international neuroblastoma risk group (INRG) classification system: An INRG task force report. J. Clin. Oncol 27(2): 289-297.

4. E Rogowitz, HM Babiker, M Kanaan, RA Millius, QS Ringenberg, et al. (2014) Neuroblastoma of the elderly, an oncologist's nightmare: case presentation, literature review and SEER database analysis. Experimental Hematology & Oncology 3(1): 20.

5. HJ Conter, V Gopalakrishnan, V Ravi, JL Ater, S Patel, et al. (2014) Adult versus pediatric neuroblastoma: the M.D. Anderson cancer center experience. Sarcoma 2014: 375151.

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6. MG Podda, R Luksch, D Polastri, Lorenza Gandola, Luigi Piva, et al. (2018) Neuroblastoma in patients over 12 years old: a 20-year experience at the Istituto Nazionale Tumori of Milan. Tumori Journal 96(5): 684-689.
7. Koc Z, Oguzkurt L (2007) Interruption or congenital stenosis of the inferior vena cava: prevalence, imaging, and clinical findings. Eur J Radiol 62(2): 257-266.
8. Croteau N, Nuchtern J, LaQuaglia MP (2021) Management of Neuroblastoma in Pediatric Patients. Surg. Oncol. Clin. N. Am 30(2): 291-304.
9. Croteau NJ, Saltsman JA, La Quaglia MP (2019) Advances in the Surgical Treatment of Neuroblastoma. Neuroblastom, pp. 175-186.
10. Minniti S, Visentini S, Procacci C (2002) Congenital anomalies of the venae cavae: embryological origin, imaging features and report of three new variants. Eur Radiol 12(8): 2040-2055.
11. Vasco PG, Lopez AR, Pineiro ML, José Ignacio Gallego Rivera (2009) Deep venous thrombosis caused by congenital inferior vena cava agenesis and heterozygous factor V Leiden mutation- a case report. Int J Angiol 18(3):147-149.
12. Peter MacDonald, DC Harwood-Nash (1971) Arterial stenosis in neuroblastoma. AJR Am J Roentgenol 112(1):167-169.
13. Bakody PJ, Stanley P (1983) Vascular stenosis with retroperitoneal rhabdomyosarcoma in a child: case report. Cardiovasc Intervent Radiol 6(3):131-132.
14. Tröbs R-B, Geyer C, Hirsch W, Andrea Tannapfel (2008) Surgical anatomy of large retroperitoneal teratomas in infants: report of two cases. Clin Med Case Rep 1: 107-111.
15. Warmann SW, Seitz G, Schaefer JF, Hans G Scheel-Walter, Ivo Leuschner, et al. (2011) Vascular encasement as element of risk stratification in abdominal neuroblastoma. Surg Oncol 20(4): 231-235.
16. Bousvaros A, Kirks DR, Grossman H (1986) Imaging of neuroblastoma: an overview. Pediatr Radiol 16: 89-106.

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