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Case report: lymphatic malformation

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ABSTRACT

Lymphatic malformation is a congenital disease caused by hamartoma malformation of the lymphatic system, affecting the skin and subcutaneous tissue. Lymphangiomas typically occur before the age of 5 and are caused by improper connections of the lymphatic ducts to the main lymphatic drainage channels. A 3-day-old female patient was examined on October 13, 2023, at the NICU of Regional General Hospital K.R.M.T. Wongsonegoro (RSWN) with complaints of lumps on two parts of the body. The patient was admitted with complaints of lumps in two areas of the body, the left neck area, and the left armpit area. Laboratory results indicated decreased CRP, hypocalcemia, hyponatremia, decreased urea, decreased creatinine, anemia, decreased erythrocyte count, and hypoalbuminemia. Lymphangioma is a rare benign congenital disorder of the lymphatic system that usually presents in childhood. Lymphangiomas result from congenital or acquired abnormalities of the lymphatic system. In this patient, the lumps were on the left side of the neck and in the left axillary region. The patient was also jaundiced for 3 days after hospitalization. The patient was delivered by caesarean section due to placenta previa. At the time of additional diagnosis, the patient had neonatal pneumonia, neonatal infection, neonatal hyperbilirubinemia, hypokalemia, sepsis, moderate asphyxia, and moderate respiratory distress. Early diagnosis, intensive monitoring, and appropriate intervention for lymphatic malformations are needed to minimize the increased risk of complications. Further research is needed to evaluate the complications of lymphatic malformations and their treatment

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INTRODUCTION

Lymphatic malformation is a congenital disease caused by hamartoma malformation of the lymphatic system, which affects the skin and subcutaneous tissue (Abdulloh & Ni'mah, 2023; Atqiaee et al., 2023; Lin et al., 2023). This disease takes the form of large vesicles, or cysts, filled with lymphatic fluid (Kulungowski & Patel, 2020; Martin-Almedina et al., 2021; Sheng et al., 2021). Lymphatic malformation is divided into 2 groups based on size and depth, namely superficial

microcyst lymphangioma circumscriptum (LC) and macrocyst with a diameter of more than 1 cm (cystic hygroma) (Wolff et al., 2008).

The lymphatic system is an additional pathway by which fluid can flow from the interstitial spaces back into the bloodstream (Ozdowski & Gupta, 2020). Through this system, substances with large molecules, such as proteins and fats, that cannot be absorbed directly from the digestive tract can be transported. The lymph channels of the lymphatic system are also very permeable to pathogens (Magold & Swartz, 2022) such as bacteria (Siggins & Sriskandan, 2022), viruses (Sunkari & Sunduru, 2020), parasites (Taheri et al., 2023), and cancer cells, so through this route, the pathogens will be excreted in destroyed form because one of the functions of this system is as the body's defense system (Oliver et al., 2020). Included in the lymphatic system are lymphatic vessels, lymphatic tissues, and lymphatic organs (Jeong et al., 2022; Petrova & Koh, 2020).

Previous studies have addressed similar topics related to lymphatic malformations in infants, providing valuable insights into the presentation, diagnosis, and management of these conditions. For example, (Atqiaee et al., 2023) reported a case of Dumble cystic lymphangioma in a 2-year-old girl presenting with vague abdominal complaints, highlighting the importance of early diagnosis and appropriate intervention. (Bekdemir et al., 2020) discussed a case of ipsilateral lymphatic and venous malformations affecting the midface area, emphasizing the need for comprehensive evaluation and management of such complex cases. (Chandra et al., 2022) focused on the medical management of vascular lesions, shedding light on current and future treatment approaches for vascular anomalies.

Despite the valuable contributions of previous studies, the current research identifies several gaps that necessitate further investigation. Firstly, there is a need for more comprehensive research on the long-term complications of lymphatic malformations and the effectiveness of different treatment modalities in improving patient outcomes. Secondly, the authors highlight the importance of exploring genetic and molecular determinants of lymphatic malformations to identify potential targets for novel therapies, as discussed by (Lee et al., 2022). Lastly, there is a gap in understanding the pathogenic exploitation of lymphatic vessels and the mechanisms underlying lymphangiogenesis, which could provide insights into the development of targeted interventions for lymphatic malformations, as suggested by (Magold & Swartz, 2022). By addressing these gaps, the current research aims to contribute to the existing knowledge base on lymphatic malformations in infants and improve clinical management strategies for better patient outcomes.

Previous research has indeed examined similar topics related to lymphatic malformations in infants, including case studies, clinical observations, and treatment outcomes. These studies have explored various aspects such as the presentation of lymphatic malformations, diagnostic approaches, management strategies, and outcomes for affected infants. Differences with the current research may include variations in patient characteristics, research methodologies, treatment modalities, and clinical outcomes. Each study may involve unique patients with specific demographics and medical histories, leading to differences in findings and outcomes. Variances in research methodologies, such as data collection methods and analysis techniques, can result in variations in the conclusions drawn from the studies. Varied treatment modalities used in previous research compared to the current study can impact the prognosis and outcomes for infants with lymphatic malformations. Differences in clinical outcomes reported in previous studies, such as symptom resolution and long-term complications, compared to the current research, can provide insights into the effectiveness of different treatment approaches. By examining these differences and similarities, researchers can enhance their understanding of lymphatic malformations in infants, identify areas for further investigation, and potentially improve patient care and outcomes.

RESEARCH METHOD

This research adopts a case study approach. The data used in the case study on lymphatic malformation in a 3-day-old female infant included laboratory results, physical examination findings, imaging results (such as x-rays), and clinical observations.
The data was collected through various methods, including: a) Laboratory tests: Blood tests were conducted to assess levels of calcium, potassium, sodium, hemoglobin, hematocrit, platelets, erythrocytes, leukocytes, bilirubin, creatinine, urea, APTT, PT, and other relevant parameters; b) Physical examination: The patient was examined for vital signs, general appearance, presence of masses or abnormalities in specific body regions, and overall health status; c) Imaging studies: X-rays and other imaging modalities were used to visualize the lymphatic malformation and assess its characteristics and extent.

Auxiliary variables such as CRP levels, blood glucose levels, HBsAg status, and INR values were also included in the data analysis to provide a comprehensive overview of the patient's health status and potential complications. The collected data was analyzed using a combination of descriptive statistics, comparison with normal ranges, and clinical correlation. Laboratory results were compared to established reference ranges to identify abnormalities. Physical examination findings were documented and correlated with imaging studies to assess the extent and characteristics of the lymphatic malformation. The overall analysis aimed to provide a comprehensive understanding of the patient's condition, guide treatment decisions, and monitor response to interventions.

RESULTS AND DISCUSSIONS

The patient came to the NICU of Regional General Hospital K.R.M.T. Wongsonegoro (RSWN) on October 12, 2023, at 10.42 WIB with complaints of lumps appearing in two parts of the body. The lump is in the left neck area and in the left armpit area. The patient was delivered by caesarean section due to placenta previa. The patient was breathing well, using a nasal cannula, and crying loudly. The patient also experienced jaundice three days after being treated at the hospital. The patient denied a history of shortness of breath, cyanosis, distress, and desaturation. The patient also did not experience a fever or respiratory problems. After 15 days of being treated in the hospital, the patient was able to breastfeed.

The patient's mother underwent three pregnancy checks with an ob-gyn doctor at Regional General Hospital K.R.M.T. Wongsonegoro. Previously, the patient's mother had a pregnancy check-up at the clinic with a midwife.

The patient's mother undergoes pregnancy checks every month. Then, in July, the patient's mother had a pregnancy check-up at the clinic, and there was a small mass on the ultrasound results, and an observation was carried out. 1 month later, the patient's mother underwent another pregnancy check and found the mass had increased in size on the ultrasound results. Then, the patient's mother was referred to an obgynecologist at RSWN, and a cholli abnormality was found on the ultrasound results. The patient's mother was given vitamins by the ob-gyn doctor at RSWN and was scheduled to have a caesarean section at the second appointment. Then, the patient's mother asked for a referral from the first health facility, namely Surya Medika Hospital and RSIA. After that, the patient's mother returned to RSWN to have her third pregnancy check-up. After that, the patient was immediately hospitalized to carry out the delivery process. The patient's mother's current complaint is that she is weak due to bleeding, to the point that the patient's mother needs 2 bags of blood. Apart from that, the patient's mother experienced dizziness, pain from stitches, and stomach cramps.

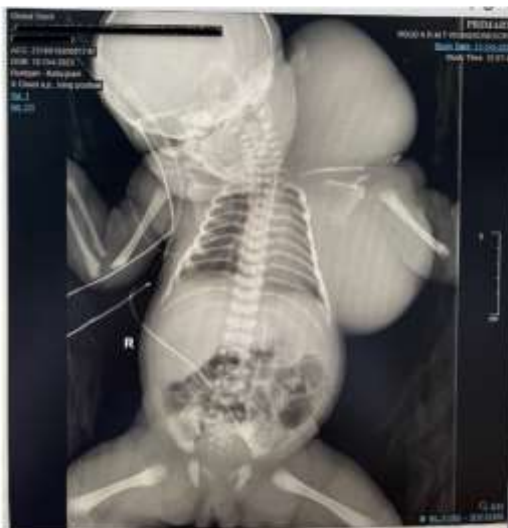

Figure 1. X Photo of Babygram (12 October 2023)

As can be seen in Figure 1, it appears that an umbilical catheter is installed with the distal end in the left hemiabdomen at the level of th 12. A multilobulated opacity with partially defined borders with regular edges in the left colli - thorax region measuring +/- 18.65 x 8.43 cm is visible. COR: CTR = 57.89%, normal shape and location. Pulmo: Vascular pattern increases. Spots were seen on both the perihilar and right paracardiac. The diaphragm and right and left costophrenic sinuses were normal. Intestinal air increases, intestinal dilatation and distension are not visible. There is no visible air in the pelvic cavity. There doesn't appear to be any free water.

IMPRESSION:
The position of the umbilical catheter is good.
Cor: Normal configuration.
Pulmo: Description of neonatal pneumonia.
Abdomen: No visible abnormalities.
Soft tissue mass with partly firm, regular border in the left colli – thorax region (size +/- 18.65 cm x 8.43 cm).

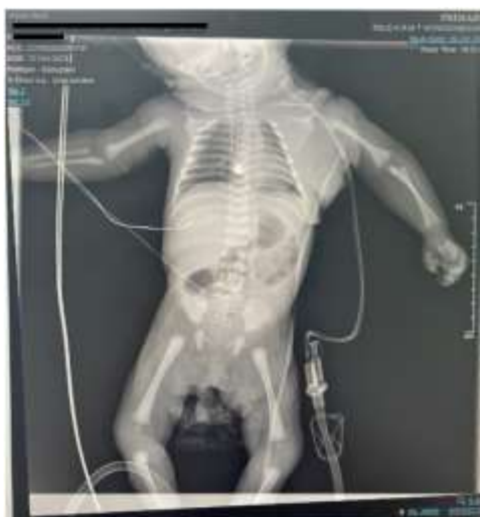

Figure 2. X Photo of Babygram (16 October 2023)

As can be seen in Figure 2, it appears that an umbilical catheter is installed with the distal end in the left hemiabdomen at the level of th 10 – 11. COR: CTR = 50%, normal shape and location. Pulmo: Vascular pattern increases. There are still visible spots on both the perihilary and right paracardial areas which are decreasing. The diaphragm and right and left costophrenic sinuses were normal. Intestinal air increases, intestinal dilatation and distension are not visible. There doesn't appear to be any free water.

IMPRESSION:
The position of the umbilical catheter is good.
Cor: Normal configuration.
Pulmo: Neonatal pneumonia picture improvement.
Abdomen: No visible abnormalities.

Table 1. Laboratory Results (12/10/2023)

	Result	Unit	Normal Range
CRP	5.10	mg/L	
Temporary Blood Glucose	84	mg/dL	70-110
Calsium	1.37	mmol/L	1-1.15
Potassium	4.80	mmol/L	3.5-5.0
Natrium	133.0	mmol/L	135-147
Creatinin	0.4	mg/dL	0.6-1.1
Ureum	12.1	mg/dL	17-43
APTT Control	26.5	Second	
APTT Patient	45.5	Second	26-34
Hemoglobin	11.3	g/dL	11-15
Hematocrit	34.10	%	40-52
Platelet Blood Count	244	uL	150.000-400.000
PT Control	12.6	Second	
PT Patient	13.0	Second	11-15
Total Erythrocytes	2.82	uL	4.7-6.1
Total Leukosit	11.5	uL	3.8-10.6
HBsAg Qualitative	Negatif		
INR	1.17		

Table 1 presents the laboratory results obtained on December 10, 2023. Notably, the CRP level is 5.10 mg/L, which falls within the normal range. Temporary blood glucose is recorded at 84 mg/dL, within the normal range of 70-110 mg/dL. Calcium levels are slightly elevated at 1.37 mmol/L, while potassium and sodium levels are within normal ranges. Creatinine and urea levels are lower than the normal range. APTT patient value is elevated at 45.5 seconds, indicating potential coagulation abnormalities. Hemoglobin and hematocrit levels are slightly below the normal range, while platelet count is within normal limits. PT patient value falls within the normal range. Total erythrocytes are below the normal range, while total leukocytes are elevated. HBsAg qualitative test results are negative. INR is slightly elevated at 1.17, suggesting a potential impairment in the clotting mechanism.

Table 2. Laboratory Results (13/10/2023)

	Result	Unit	Normal Range
Albumin	3.2	g/dL	3.8–5.1

Table 2 showed the laboratory results obtained on October 13, 2023. Albumin level is reported as 3.2 g/dL, which falls below the normal range of 3.8–5.1 g/dL. This indicates a lower than normal concentration of albumin in the blood, which may warrant further investigation or clinical consideration depending on the patient's specific medical context.

Table 3. Laboratory Results (15/10/2023)

	Result	Unit	Normal Range
Calsium	0.80	mmol/L	1-1.15
Potassium	4.40	mmol/L	3.5-5.0
Natrium	140.0	mmol/L	135-147
APTT Control	26.8	Second	
APTT Patient	32.7	Second	26-34
Hemoglobin	13.3	g/dL	11-15
Hematokit	40.70	%	40-52
Total Platelet	190	uL	150.000-400.000
PT Control	12.2	Second	
PT Patient	15.6	Second	11-15
Total Erythrocytes	3.7	uL	4.7-6.1
Total Leukosit	10.0	uL	3.8-10.6
Indirect Bilirubin	18.74	mg/dL	0.2-0.8
Direct Bilirubin	0.48	mg/dL	0.1-0.3
Total Bilirubin	19.22	mg/dL	0.1-1.2
INR	1.20		

Table 3 presents the laboratory results obtained on October 15, 2023. In this set of results, several observations can be made. Calcium levels are notably low at 0.80 mmol/L, falling below the normal range. Potassium and sodium levels are within normal limits. APTT patient value is slightly elevated at 32.7 seconds, potentially indicating a mild coagulation abnormality. Hemoglobin and hematocrit levels are within normal ranges, as is the platelet count. PT patient value is elevated at 15.6 seconds, indicating a potential impairment in the clotting mechanism. Total erythrocytes are below the normal range, while total leukocytes are within normal limits. Indirect bilirubin is elevated at 18.74 mg/dL, exceeding the normal range, whereas direct bilirubin and total bilirubin levels are also elevated. The INR value is slightly elevated at 1.20.

Table 4. Laboratory Results (16/10/2023)

	Result	Unit	Normal Range
Calsium	0.90	mmol/L	1-1.15
Potassium	4.80	mmol/L	3.5-5.0
Natrium	123.0	mmol/L	135-147
Hemoglobin	17.2	g/dL	11-15
Hematocrit	51.30%	%	40-52
Total Platelet	98	uL	150.000-400.000
Total Erythrocytes	5.05	uL	4.7-6.1
Total Leukocytes	12.4	uL	3.8-10.6

Table 4 displays the laboratory results obtained on October 16, 2023. In this set of results, the following observations can be made: Calcium levels have slightly increased to 0.90 mmol/L but still remain below the normal range. Potassium levels are within the normal range at 4.80 mmol/L. Sodium levels are notably low at 123.0 mmol/L, falling below the normal range. Hemoglobin and hematocrit levels are elevated, with hemoglobin recorded at 17.2 g/dL and hematocrit at 51.30%, both exceeding the normal range. Platelet count is below the normal range at 98 uL. Total erythrocytes are within the normal range. Total leukocytes are elevated, exceeding the normal range.

On physical examination, there was composmentis consciousness (E4V5M6), low SpO2 (100%), tachypnea (respiratory rate 42x/minute), pulse 116x/minute, and normal temperature (360C). The birth weight was 3580 grams, the birth length was 47 cm, and the BMI was 16.20 kg/m2. In the Colli Sinistra region, a soft mass appears, feels cystic, and the boundaries are quite firm, mobile, and the same color as the surrounding skin. In the Axilla Sinistra region, the mass appears soft, palpable cystic, and the boundaries are quite firm, mobile, and the same color as the surrounding skin.

According to the results of supporting examinations, lab results showed decreased CRP, hypocalcemia, hyponatremia, decreased urea, decreased creatinine, anemia, decreased erythrocyte count, and hypoalbumin. From the x-photo babygram examination, it was found that a soft tissue mass had partly firm, regular edges in the left colli-thorax region (size +/- 18.65 cm x 8.43 cm).

Lymphangioma is a rare, benign congenital disorder of the lymphatic system that usually appears in childhood. Of the lymphangiomas, 50% are present at birth, and 90% of lymphangiomas appear by 2 years of age. These tumors mostly occur in the head and neck (75%) or axilla (20%). Even though it is benign, this tumor can grow quite large and cause damage. Depending on the location, this disease can even interfere with the normal function of swallowing and breathing or, in the case of axillary lymphangioma, disrupt the normal range of motion of the arm (Kurumety et al., 2022). At the time of additional diagnosis, the patient experiences neonatal pneumonia, neonatal infection, neonatal hyperbilirubinemia, hypokalemia, sepsis, moderate asphyxia, and breathing problems that are classified as moderate.

Lymphangioma occurs due to congenital or acquired abnormalities in the lymphatic system. The congenital form usually occurs before 5 years of age and is caused by an improper connection of the lymphatic ducts to the main lymphatic drainage channels. Acquired lymphangioma occurs as a result of disruption of previously normal lymphatic drainage, such as from surgery, trauma, malignancy, or radiation therapy (Miceli & Stewart, 2023).

The exact cause of lymphangioma formation is unknown, but most cases are believed to be sporadic (Bekdemir et al., 2020). Lymphangioma formation may reflect failure of lymphatic channels to connect with the venous system during embryogenesis, abnormal absorption of lymphatic structures, or both (Lee et al., 2022; Leong & Witte, 2022). Current research has described several vascular growth factors that may be involved in the formation of lymphatic malformations, such as VEGF-C and FLT-4. Genetic studies in lymphangioma sufferers show mutations in chromosomes 13, 18, 21, VEGF-C, and its receptor. Cases secondary to trauma and infection have also been reported (Goss et al., 2023; Khanwalkar et al., 2020).

This patient experienced jaundice 3 days after being treated at the hospital. The patient's general condition is good if the lymphangioma does not cause complications. If infection occurs in the lesion, the patient may have a fever, the lymphangioma may feel warm and tender, or the overlying skin may shine. Typically, lymphangiomas are unilateral (15% are located in the midline) but can spread to other sides of the body over time (Seyi-Olajide et al., 2020).

Lymphangioma, if uncomplicated, is a benign lesion that does not require treatment except for cosmetic reasons (Chandra et al., 2022; Hyvönen et al., 2022). However, if the complications are complicated or there is an increased risk of complications, treatment becomes mandatory. Various types of interventions can be used to cure lymphangiomas—aspiration, surgical excision, laser ablation, radiofrequency ablation, percutaneous injection of sclerosing agents, or a combination of radiochemotherapy—but surgical removal of cystic tumors remains the gold standard of therapy (Hassan & Aly, 2012; Mirza et al., 2010).

In this particular case, the lump was detected in the left neck region as well as in the left armpit area of the patient. The patient underwent a caesarean section delivery due to placenta previa. Throughout the course of her pregnancy, the patient's mother had three check-ups with an ob-gyn doctor at RSWN. Currently, the patient's mother continues to undergo monthly pregnancy checks. Subsequently, she was referred to an ob-gynecologist at RSWN, who identified a cholli abnormality through ultrasound results. The patient's mother's primary concern at present is her weakness caused by excessive bleeding, which has led to the need for two units of blood. Additionally, she has been experiencing dizziness, pain from the stitches, and stomach cramps.

Early diagnosis, intensive monitoring, and appropriate intervention for lymphatic malformation are necessary to minimize the increased risk of complications. Further research is needed to evaluate the complications of lymphatic malformation and its treatment.

CONCLUSION

Lymphangioma occurs due to congenital or acquired abnormalities in the lymphatic system. Early diagnosis, intensive monitoring, and appropriate intervention for lymphatic malformation are necessary to minimize the increased risk of complications. Further research is needed to evaluate the complications of lymphatic malformation and its treatment.

Research on lymphatic malformations in infants offers significant implications and contributions to the field of pediatric healthcare. By enhancing diagnostic approaches, studies can lead to early and accurate identification of these conditions, enabling timely interventions and improved outcomes for affected infants. Furthermore, the optimization of treatment strategies through research findings can guide healthcare providers in selecting the most effective interventions, ultimately enhancing patient outcomes and quality of life. Advancements in medical knowledge resulting from these studies contribute to a deeper understanding of pediatric lymphatic disorders and pave the way for further research and innovation in related fields. Additionally, the development of clinical guidelines and protocols based on research outcomes can standardize care practices, improve treatment consistency, and enhance patient safety. Educational initiatives stemming from research on lymphatic malformations can raise awareness among healthcare professionals and the public, leading to early detection, appropriate referrals, and better support for affected infants and their families. Overall, research on lymphatic malformations in infants plays a crucial role in improving clinical practice, patient care, medical education, and scientific knowledge in the realm of pediatric healthcare.

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