Volume 1 | Issue 4 |2022

SMART PEDI UPDATE

Pedi smart News Letter
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Dear Doctor,
Greetings from Micro Labs Limited. We are happy to bring you **"PEDI SMART"**which contain latest and interesting news in the field of Paediatrics.

This issue contains:

1. **Culture-positive neonatal sepsis with haematological anomalies.**
2. **A Retrospective investigation on the thrombosis and haemorrhage experienced by hospitalised children with SARS-CoV-2 infection or MIS-C.**
3. **Outcomes and sociodemographic risk factors of postoperative complications following gastrointestinal paediatric surgical procedures.**
4. **A case report of 2-year-old child with severe Graves' disease and hepatic impairment**

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Limited

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1. Culture-positive neonatal sepsis with haematological anomalies

Introduction:

A dangerous illness known as neonatal sepsis occurs when microorganisms enter the circulation, reproduce, and release toxins that have a negative impact on the health of newborns. Based on onset, it is separated into two categories. Sepsis can manifest early or late depending on when it starts—early sepsis starts within 72 hours after birth, late sepsis starts beyond 72 hours.[1] Neonatal sepsis can be bacterial, viral, or fungal infection. The most frequent hematologic abnormalities in newborn sepsis include anaemia, leukocytosis, thrombocytopenia, and a delayed coagulation time. The knowledge of the haematological abnormalities in neonatal sepsis is however, insufficient.[2] As a result, the goal of this study was to quantify the severity of haematological abnormalities in neonatal sepsis.

In neonatal sepsis, the degree of anaemia, leucopenia, and thrombocytopenia is significant. In order to avoid future complications in neonatal sepsis, anaemia, leucopenia, and

Methods

This cross-sectional research involved 143 neonates at the University Referral Hospital who had sepsis that had been confirmed by a culture. The clinical and laboratory information was collected using a data collection form, while the sociodemographic data were obtained using a pretested structured questionnaire. The complete blood count (CBC) and blood culture analyses required the collection of a total of 2 mL of venous blood using a vacutainer collection instrument. The causes of haematological abnormalities in neonatal sepsis were investigated using a univariate and multivariate logistic regression model. When a p-value was less than 0.05, statistical significance was determined.

Results:

Neonatal sepsis was associated with anaemia, thrombocytopenia, and leucopenia with a prevalence of 49 percent (95% CI: 40.89-57.06), 44.7 percent (95% CI: 36.8-52.9), and 26.6 percent (95 % CI: 22.01-29.40), respectively. Leukocytosis and thrombocytosis, on the other hand, were discovered in 7.7 percent (95 % confidence interval [CI]: 4.35-13.25) and 11.9 percent (95 % Confidence interval]: 7.56-18.21), respectively. Significant anaemic predictors included being female (AOR: 3.3; 95 percent CI: 1.20-3.82) and being less than 7 days old (AOR: 2.44; 95 %CI: 1.6-6.9).

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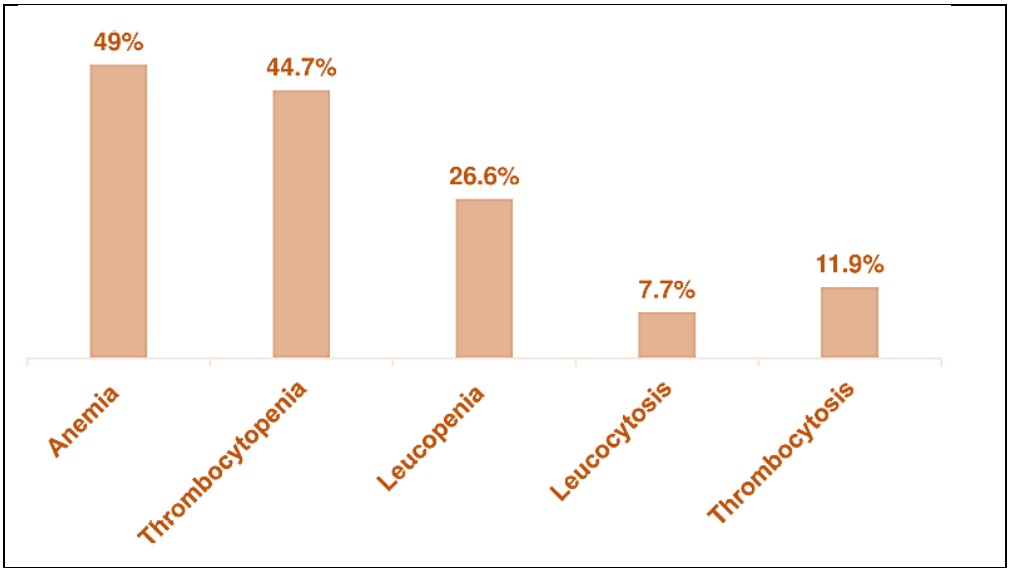
Discussion:

There are higher rates of morbidity and death associated with neonatal sepsis. [3] Sepsis can be accurately and quickly detected, which will enhance clinical outcomes and lower antibiotic consumption. The most frequent hematologic abnormalities in sepsis patients include anaemia, leukocytosis, thrombocytopenia, and activation of the hemostatic system. Nearly all patients had hematologic organ system failure, which is a frequent early sign of severe sepsis.[2] Anemia is more prevalent in this research. Studies have revealed that anaemia worsen sepsis. Therefore, various degrees of a decrease in Hgb concentration frequently occur together with sepsis.[4]



Magnitude of hematological abnormalities in neonatal sepsis.

Conclusion:

In neonatal sepsis, the severity of anaemia and thrombocytopenia is significant. Additionally, having a female gender and a group age of less than 7 days were predictive markers for anaemia. In order to avoid future difficulties in neonatal sepsis, anaemia, leucopenia, and thrombocytopenia should be diagnosed and treated.

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2. A Retrospective investigation on the thrombosis and haemorrhage experienced by hospitalised children with SARS-CoV-2 infection or MIS-C

Introduction:

The severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2) infection was already linked to coagulopathy, markedly increased D-dimers, and venous thromboembolism(VTE) in hospitalised patients. Adults hospitalised as a result of these conditions experience negative consequences, such as higher mortality.[1] According to data, children are less affected than adults, making up about 5% of persons with the disease. 1% of all hospital admissions Nevertheless, there have been a small percentage of children have had major illness necessitating critical care and less number of documented child deaths than the age of 18.[2] This study set out to: (a) identify the prevalence of haemorrhage and/or thrombosis; (b) describe the characteristics of haemorrhage and thrombosis with management; and (c) evaluate the association between thrombotic and bleeding complications and underlying comorbidities in hospitalised children with SARS-CoV-2 and MIS-C.

Thrombosis and hemorrhage are uncommon events in childrenwith SARSCoV- 2

Methods:

Information on the clinical symptoms of SARS-CoV-2 and multisystem inflammatory syndrome (MIS-C) in hospitalised children up to 18 years of age was gathered through an international multicentered (n = 15) retrospective registry. Data on coagulopathy, haemorrhage, and thrombosis among hospitalised children with SARS-CoV-2 or MIS-C are presented in this retrospective cohort sub-study. tient demographics, comorbidities, clinical presentation, hospital course, laboratory data, care, and outcomes were among the study's characteristics. Patient demographics, underlying risk factors for hemorrhagic and/or thrombotic conditions, clinical presentation, including new hemorrhagic or thrombotic events while hospitalised, disease course, and severity as assessed by admission to the intensive care unit (ICU), use of cardiorespiratory supports, treatments, and complications were collected.

Results:

Nine hundred eighty-five children were enrolled, of whom 915 (93%) had clinical data accessible; 385 (42%) exhibited symptoms consistent with SARS-CoV-2 infection, 288 had MIS-C, and 242 (26.4%) had SARS-CoV-2 discovered by coincidence. Ten children (1%) suffered from thrombosis, sixteen (1.7%) from haemorrhage, and two (0.2%) from both (thrombosis and haemorrhage). Children with primary SARS-CoV-2 and those with

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MIS-C both had significantly higher rates of prothrombotic comorbidities such as congenital heart disease (p-value.007), respiratory support (p-value.006), and central venous catheter (CVC) (p=.04). Children with primary SARS-CoV-2 also had significantly higher rates of respiratory support (p-value.003), obesity (p-value.002), and cytokine storm (p = .012).

	All patients (*N* = 915)	Primary SARS-CoV-2 (*N* = 385)	MIS-C (*N* = 288)	Incidental SARS-CoV-2 (*N* = 242)
Age (years); median (IQR)	4.6 (1.1–11)	3 (0.8–11)	6.1 (3–10)*	4.3 (0.9–12)
Gender (male), *N* (%)	561 (74%)	282 (73%)	162 (57%)	43 (17%)
Total number of episodes of hemorrhage and thrombosis, *N* (%)				
Thrombosis	10 (1.0%)	5 (1.3%)	3 (1%)	2 (0.8)
Hemorrhage	16 (1.7%)	11 (2.8%)	4 (1.8%)	1 (0.4%)
Hemorrhage and thrombosis	2 (0.2%)	0	2 (0.7%)	0

Demographic features of hospitalized children infected with SARS-CoV-2 orMIS-C (*N* = 915)

Discussion:

This study presents the clinical range of new thrombotic and bleeding events in a large cohort of hospitalised children with MIS-C or SARS-CoV-2 infection. Children had far lower rates of thrombosis and haemorrhage compared to hospitalised adults, and they weren't linked to fatality.[3] The current investigation confirms earlier findings that there is no association between haemorrhage and mortality in paediatric SARS-CoV-2 patients.[4]

Conclusion:

Children with SARSCoV-2 rarely experience thrombosis and haemorrhage; instead, individuals who already have comorbid conditions are more likely to experience these conditions. Children have far lower incidence of thromboses than adults, and there is no apparent association between these rates and prognosis. With the emergence of different SARS-CoV-2 virus strains, ongoing study is essential to determining the proper therapy of coagulopathy and thromboprophylaxis in paediatric patients.

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3. Outcomes and sociodemographic risk factors of postoperative complications following gastrointestinal paediatric surgical procedures

Introduction:

Surgeons are always concerned about postoperative complications (POCs) since they might prove fatal or lifelong disabilities. Surgery is a high-risk, resource-intensive procedure with a lot of chances of error, therefore it plays a major part in healthcare-related problems, both in adults and in children. The most of paediatric surgical problems that occur on a national scale are caused by operations that are often done on multitudes of healthy children and have relatively low complication rates.[1] A number of socio-demographic traits are linked to complications after specific paediatric surgical procedures.[2] The aim of this extensive study was to identify sociodemographic risk variables and the resource usage of children who had difficulties following routine paediatric surgical procedures.

Young age, male sex, being an African American or Native American as well as receiving treatment in a rural hospital were all linked to an elevated risk of postoperative complications.

Methods:

In order to identify and describe paediatric patients (aged 0–21 years) who underwent common inpatient paediatric gastrointestinal surgical procedures, such as appendectomy, cholecystectomy, colonic resection, pyloromyotomy, and small bowel resection, researchers conducted a population-based cohort study using the Healthcare Cost and Use Project Kids' Inpatient Database (KID). Sociodemographic correlates of postoperative complications were found using multivariable logistic regression modelling. Patients with and without postoperative complications were compared in terms of length of stay and hospitalisation expenses.

Results:

Pediatric surgical hospitalizations totalling 66,157 were found. 2,009 of these individuals suffered from problems following surgery. Postoperative problems were much more likely to occur in patients who were male, young, of African American and Native American ethnicity, and who received care in a rural hospital. Comparing patients with problems to those without complications, the mean duration of stay was 4.58 days longer and the mean total expenses were $11,151 (US) higher in the complication cohort.

Discussion:

One of the biggest cohorts of paediatric surgical hospitalizations was a study of 66,157 admissions, which represented an estimate of children undergoing certain gastrointestinal surgical procedures. The results indicated that there was a higher risk of problems following paediatric gastrointestinal surgery among new-borns, men, people of colour, and patients receiving care in remote facilities. As a result, problems were linked

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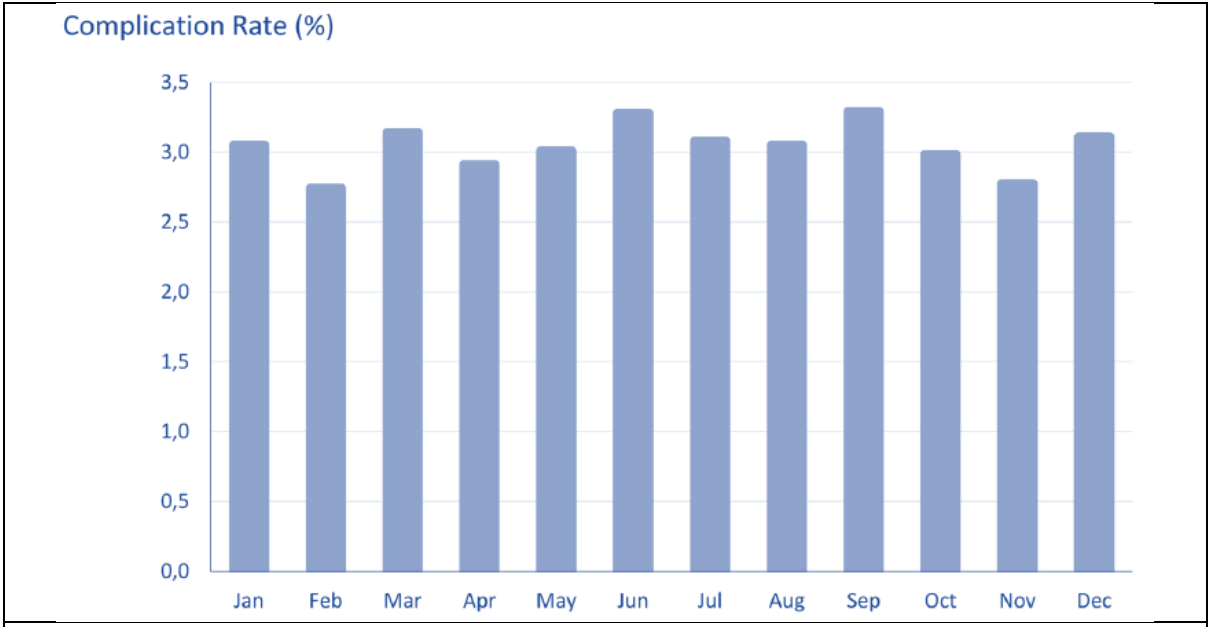
to more expensive hospital stays and longer hospital stays.[2] Researchers combined methods with unique peaks in frequency related to age. It was possible to identify young age as a predictor for an elevated risk of problems following paediatric gastrointestinal surgeries by controlling for procedure type in the models. This data is consistent with others that have shown age-related variations in postoperative complication rates in children.[3]



Postoperative complication rate over time in total cohort

Conclusion:

Pediatric gastrointestinal inpatient surgery postoperative problems were associated with higher healthcare costs. Prior to paediatric surgical operations, the discovered sociodemographic risk variables should be taken into account in the risk stratification. To eliminate surgical inequities and avoidable consequences, targeted treatments are needed.

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4. A case report of 2-year-old child with severe Graves' disease and hepatic impairment

Introduction:

Graves' disease is an autoimmune condition that mostly affects the thyroid gland. It is the most common cause of hyperthyroidism. It is a condition with widespread symptoms that mostly affects the liver, eyes, heart, skeletal muscles, skin, and other soft tissues. High morbidity and fatality rates can occur if Graves' disease in case of delayed diagnosis.[1] Children are more likely than adults to have a severe clinical presentation upon diagnosis, which might be mistaken for more common paediatric diseases.[2] Here is a case of hyperthyroidism in a young child who had acute hepatitis, along with treatment.

In cases where thyroid function is improving but liver function is worsening, other causes of hepatic injury should be considered, including drug-induced hepatotoxicity and autoimmune

Case Presentation:

A Caucasian 2-year-old child who had previously been well presented at the emergency room with a 1-week history of diarrhoea. An examination revealed scleral icterus and hepatomegaly. She experienced increasing jaundice, reduced oral intake, and lethargy throughout the course of the next 48 hours. She had received the standard immunizations recommended for her age. She was admitted to a hospital to have her hepatitis examined. Initial tests revealed elevated levels of ALT (reference range: 11–30 U/L), AST (1055 U/L (5–57 U/L), GGT (334 U/L, 15 U/L), bilirubin (reference range: 3–20 U/L), and ALP (841 U/L, range: 120–370 U/L). The results of an abdominal ultrasound showed oedema and thickness of the gallbladder but no signs of hepatobiliary obstruction. Hepatitis A/B/C/E viruses, Epstein-Barr virus, CMV, and HHV-6 were all ruled out by serology. A previous infection was suggested by parvovirus B-19 serology. A serology for autoimmune hepatitis, including tests for ANA, smooth muscle antibodies, and liver-kidney microsomal antibodies, came out negative as well. She was determined to be tachycardic with a heart rate of 130-165 beats per minute and was consistently hypertensive, with systolic blood pressure 120-132 mmHg and diastolic blood pressure 68-72 mmHg. Her pulses were bounding, she had a systolic murmur. S she was 3.5 cm taller than her 4-year-old brother and weighed on the 75th percentile for her age. Upon closer examination, a smooth goitre with 4-cm lobes and hyperreflexia was discovered. She had scleral icterus and prominent eyes. Below the costal margins, she had a palpable liver and spleen. The electrocardiogram (ECG) revealed sinus tachycardia and perhaps left ventricular enlargement. A normal cardiac profile and no enlarged pulmonary or vascular marks were visible on the chest x-ray. With TSH < 0.00 mIU/L, T3 30 pmol/L (4–7 pmol/L), and T4 >64.4 pmol/L (10–20 pmol/L), further tests showed hyperthyroidism. Thyroglobulin antibody levels of 84.1 kIU/L (4.0 kIU/L), thyroid peroxidase antibody levels of >1000 kIU/L (5.6 kIU/L), and thyroid receptor antibody levels of 34.7 IU/L (1.8 IU/L) were all consistent with autoimmune hyperthyroidism. At five years and a month, the bone age was advanced . A considerable microcytic

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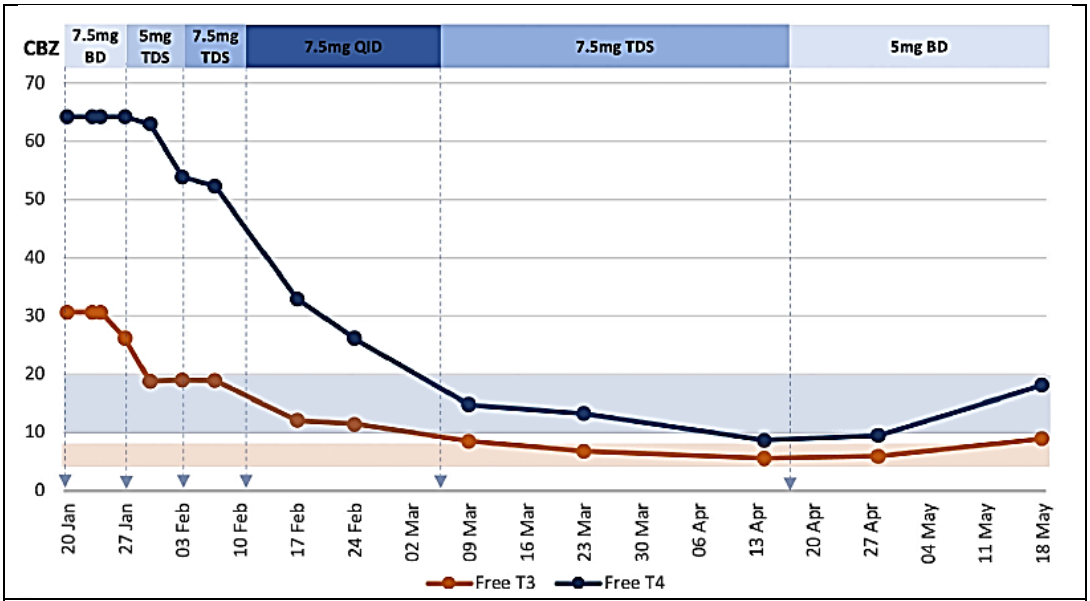
hypochromic anaemia was detected in the whole blood count, with Hb of 82 (105-138 g/L), MCV 49 (70-88 fL), and MCH 14 (22-30 g/L). Carbimazole(CBZ) at 1 mg/kg/day, Lugol's iodide at 0.1 mL/day, and propranolol at 5 mg TDS were used to start the treatment. On the seventh day of therapy, lugol's iodide was stopped. Over a period of three weeks, the carbimazole dosage was increased to 2 mg/kg/day. Four weeks into the therapy, T4 returned to the normal range, and six weeks into the therapy, T3 did the same. Propranolol was used to manage symptoms, and 1 month after the start of the treatment, this dose was reduced. Liver function started to get better as antithyroid medication started, and after 8 weeks, it was back to normal. The liver's synthetic function, as well as its albumin and coagulation profiles, remained normal throughout the illness. In the first ocular examination, the visual acuity was normal, there was mild bilateral proptosis with inferior scleral show, and the eye movements were complete. At the 6-month checkup, proptosis was resolved.



Thyroid function tests and carbimazole (CBZ) from weeks 1 to 16 of treatment. Shaded bars indicate normal range for T3 (orange) and T4 (blue)

Discussion:

Hepatobiliary dysfunction is a very rare complication of severe hyperthyroidism, which is necessary for the liver to function normally. When Graves' illness first manifests, abnormal liver function tests are common, with 37–78% of patients having at least one increased liver enzyme.[2] ALP is most frequently elevated, however other blood tests including bilirubin, AST, and GGT may also be elevated. [3] In this case, thyroid function did not improve until the dose was increased to 1.3 mg/kg/day, and thyroid function was only normalised with 2 mg/kg/day. In a case report of a 3-year-old with thyrotoxicosis, thyroid function had to be normalised at 1.8 mg/kg/day, suggesting that younger children may need greater dosages of CBZ.[4] Researchers hypothesise that higher hepatic mitochondrial activity, which has been observed in liver biopsies of patients with thyrotoxicosis, may result in greater CBZ inactivation.

Conclusion:

In young children, hyperthyroidism is an uncommon condition. Tachycardia, hypertension, and the presence of a goitre are indicators of hyperthyroidism and should

elicit a preliminary TSH and free T4/T3 evaluation. Despite the extremely low risk of drug-induced hepatotoxicity, thyrotoxicosis-related liver damage can be safely treated with anti-thyroid medications. Drug-induced hepatotoxicity and autoimmune hepatitis should be taken into consideration when thyroid function is improving but liver function is deteriorating. The suggested initial dose of 0.4-0.8 mg/kg of methamethiazole (MMI)/CBZ may not be sufficient to manage thyrotoxicosis in young children.

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