

Pedismart Newsletter Vol 3 | Issue 13 | 2024

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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. Evaluation of relationship of atopy with disease severity in children with *Mycoplasma pneumoniae* pneumonia**
- 2. Evaluation of impact of overweight/obesity and dietary antioxidant quality score on hypertension risk in children and adolescents**
- 3. Evaluation of the prevalence of early adiposity rebound and the factors associated with its occurrence in a cohort of extremely low birth weight infants**
- 4. Case report on Rhabdomyosarcoma of the gallbladder in a child**

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

Evaluation of relationship of atopy with disease severity in children with *Mycoplasma pneumoniae* pneumonia

Introduction

Mycoplasma pneumoniae is a common and important pathogen of respiratory tract infection that primarily affects children and young people.¹ *Mycoplasma pneumoniae* (MP) invades and colonises respiratory tract epithelial cells and also penetrate host cell plasma membrane and invade the respiratory mucosa.² Atopy is a condition in which the body develops atopic disorders like asthma, allergic rhinitis, and atopic dermatitis easily in response to external environment. Symptoms of atopy includes skin itching, rash, nasal congestion, runny nose, sneezing, and cough, accompanied by CD4+ T helper type 2 cell differentiation and overproduction of immunoglobulin E (IgE). Many studies have shown that children with an atopic constitution were more likely to have a pulmonary *M. pneumoniae* infection. This infection leads to increase in IgE levels.¹ The purpose of this study was to explore the impact of atopy on the severity of MPP and to evaluate the role of IgE in disease pathogenesis.

Atopy was positively correlated with the severity of *Mycoplasma pneumoniae* pneumonia in children.

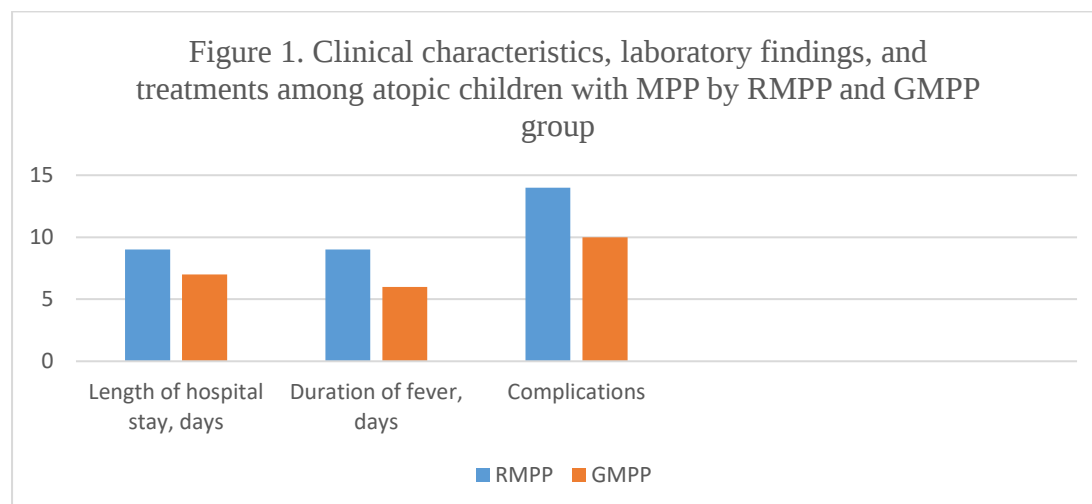
Methods

A retrospective analysis was carried out which included 539 children who were divided into an atopic group and a non-atopic group. In order to evaluate the effect of atopy on disease severity in children with *mycoplasma pneumoniae* pneumonia (MPP), children were also randomised to either a refractory MPP (RMPP) group or a general MPP (GMPP) group. The IgE levels in the atopic and non-atopic groups were compared. Clinical characteristics, laboratory findings, clinical treatments were analysed.

Results

Out of 539, 195 (36.1%) children were assigned to the atopic group, and 344 children (63.9%) were assigned to the non-atopic group. The atopic group experienced a significantly longer hospital stay, a longer duration of fever, and a higher incidence of wheeze than the non-atopic group. The atopic group showed significantly higher percentages of patients with RMPP and extra-pulmonary problems (15.9% vs. 9.3% and 48.2% vs. 32.0%, respectively, all $P < 0.05$) compared to the non-atopic group. Total serum IgE levels in the atopic group were significantly higher than in the non-atopic group (217.5 vs. 73.0). Hormone therapy was necessary for 218 children (40.4%) with MPP, 47.2% in the atopic group vs. 36.6% in the non-atopic group. The atopic group used fiberoptic bronchoscopy and oxygen treatment at much higher rates than the non-atopic group. The RMPP group showed a higher prevalence of atopy ($P < 0.05$) in comparison to the GMPP group. Furthermore, compared to the GMPP group, the RMPP group experienced a significantly longer hospital stay and longer fever ($P < 0.05$) (Figure 1). Prolonged fever and hospitalization, lymphocyte count, procalcitonin and lactate dehydrogenase levels and steroid treatment were all significantly higher ($P < 0.05$) in atopic children with refractory MPP, compared to general MPP. Strong correlations between atopy

and male sex, duration of hospital stay, length of fever, IgE level, wheezing, lobar pneumonia, refractory MPP, and therapy with oxygen, hormones, or bronchoscopy was found by Spearman correlation analysis ($P < 0.05$).



Discussion

Study results showed that atopic children with MPP have a high risk of asthma attack. More children in the atopic group than the non-atopic group experienced refractory MPP and had a higher incidence of severe wheezing and prolonged fever and high incidence of lobar pneumonia and fiber bronchoscope-assisted therapy and hormone therapy. Children in the RMPP group showed a higher prevalence of atopy. These results suggested that atopy may be linked to severe MPP and with significantly greater difficulty in the successful management of this disease. Total serum IgE level was significantly higher in children with atopy compared to those without atopy.¹ This study finding was consistent with the findings of a recent result which showed a relationship between atopy and IgE production during *M. pneumoniae* infection.³ This study suggested long-term hormone treatment as well as fiberoptic bronchoscopy—assisted as a treatment, but some studies have suggested glucocorticoid and fiberoptic bronchoscopy which can effectively improve the clinical indicators of the children with mycoplasma pneumonia.⁴

Conclusion

Atopy had a strong association with the severity of the disease in children with MPP, suggesting that it may be a risk factor for the condition. Additionally, bronchial mucosal inflammation and concomitant immune response mechanisms may be linked to more severe clinical presentation in children with RMPP.

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Evaluation of impact of overweight/obesity and dietary antioxidant quality score on hypertension risk in children and adolescents

Introduction

High blood pressure and hypertension in children and adolescents is becoming more common health issues nowadays. An estimation of 3.5%-5% of children and adolescents suffer from hypertension.¹

Childhood obesity was linked to an increased risk of developing chronic conditions like hypertension and diabetes. Chronic diseases may arise as a result of oxidative damage and inflammation associated with obesity.² Multiple studies also demonstrated an association between childhood obesity and current and adult hypertension. However, it was suspected that BMI and dietary antioxidant quality score (DAQS) might have combined effects on hypertension in children and adolescents.¹ Using data from the National Health and Nutrition Examination Survey (NHANES), this study aimed to investigate the impact of overweight/obesity and DAQS alone and in combination on children and adolescents risk of hypertension.

BMI-for-age <85th percentile and DAQS <3 have been associated to a decreased risk of hypertension

Methods

A cross-sectional study was carried out among 14,316 participants. BMI-for-age and DAQS were main variables in this study. Overweight is defined to those with 85th to less than the 95th percentile while obesity is defined to those $\geq 95^{\text{th}}$ percentile. DAQS was classified into the two groups, <3 group and ≥ 3 group. Hypertension was the main outcome in this study. The associations of overweight/obesity and DAQS with the risk of hypertension was investigated using multivariate logistic regression analysis.

Results

The proportion of children in the hypertension group (51.44% vs. 35.60%) with a BMI for age $\geq 85^{\text{th}}$ percentile was greater than that of the non-hypertension group. There may be a lower risk of hypertension in children whose BMI is <85th percentile. In children and adolescents, after adjusting for confounding factors, non-obesity has been associated to a lower risk of hypertension. BMI-for-age <85th percentile and DAQS <3 have been associated to a decreased risk of hypertension in individuals compared with children with BMI-for-age $\geq 85^{\text{th}}$ percentile

and DAQS <3. Subgroup analysis showed that among participants aged ≥ 12 years, there was a lower incidence of hypertension in the groups with BMI for age <85th percentile and DAQS <3, as well as in the group with BMI for age <85th percentile and DAQS ≥ 3 (Figure 1).

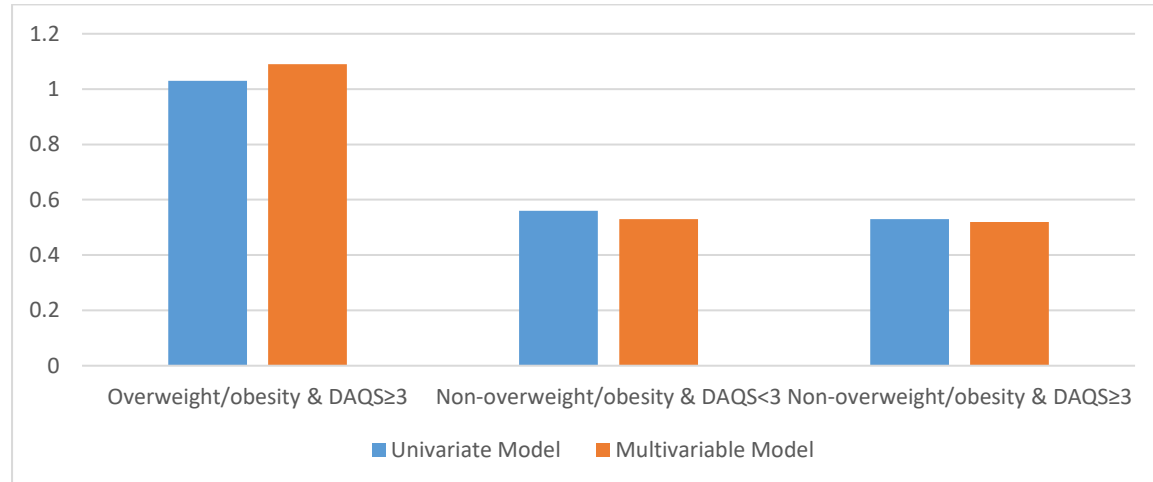


Figure 1. Results of combined effect of overweight/obesity and DAQS with the risk of hypertension

Discussion

The findings of the current study indicated that children and adolescents with BMIs for age $\leq 85^{\text{th}}$ percentile had a decreased risk of developing hypertension.¹ According to San tiago et al., children who were obese had a 2.82-fold higher risk of high blood pressure compared to non-obese children.³ Early interventions, such as changing the poor lifestyles, doing more exercises combining with improving the diet quality was recommended for children and adolescents with normal weight. This study results determined that overweight/obesity and DAQS had combined effects on the risk of hypertension in children and adolescents, but the authors were unable to find a relationship between DAQS and the risk of hypertension in children and adolescents.

Conclusion

According to the results, overweight/obesity and DAQS had combined effects on the risk of hypertension in children and adolescents. It was recommended that children and adolescents who were normal weight were recommended to maintain their weight, increase their physical activity, and adopt healthier eating habits.

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Evaluation of the prevalence of early adiposity rebound and the factors associated with its occurrence in a cohort of extremely low birth weight infants

Introduction

Preterm birth is increasing globally. Around 15 million preterm infants are born each year and are facing prematurity-related complications which was the most common cause of death during the first years of life. Survivors of premature birth have a higher risk to adverse health consequences in later life, including metabolic and cardiovascular disorders.¹ BMI rapidly increases during the first year of life, which thereafter falls to a minimum between the ages of five and seven. Early adiposity rebound (EAR) can be diagnosed if the BMI curve hits its lowest point before the age of five. Adult obesity and other obesity-related comorbidities can be predicted by an EAR.² The purpose of the current study was to assess the frequency of EAR and factors associated to its occurrence in a group of ELBW infants. In addition, study examined the prevalence of overweight and obesity in children in the EAR group and in timely AR (Adiposity rebound) group, as well as their blood pressure values from 4 years of age onward.

Prevalence of overweight and obesity was higher in the early adiposity rebound group than in the timely adiposity rebound group.

Methods

A retrospective longitudinal observational study was conducted which included ELBW infants. Adiposity rebound was measured at the timing of lowest registered BMI. EAR was classified based on if AR occurred before 5 years of age. Based on the World Health Organization's (WHO) BMI growth charts, children with a BMI $\geq 85^{\text{th}}$ percentile as overweight and those with a BMI $\geq 97^{\text{th}}$ as obese. Using a multivariate binary logistic regression analysis, variables that were independently associated with EAR were found.

Results

The study included 212 ELBW infants in total. About 40.6% of the participants in the study presented EAR, and 21.5% had it before attaining 4 years of age. Multivariate binary logistic regression analysis showed only exclusive or partial formula milk feeding was independently linked to an increased probability of developing EAR compared to exclusive human milk feeding. Mean BMI of children with EAR had higher than that of children without EAR (Figure 1). Children with EAR had greater rates of overweight and obesity at 6 years (10% vs. 1%; 5% vs. 1%, respectively, $p=0.009$) and 7 years (12.5% vs. 1%; 7% vs. 1%, respectively, $p=0.001$) than children in the timely AR group. At 10 years, there was also a difference in the percentage of overweight and obese children with 21% of children with EAR being overweight and 16.7%

of them were obese, compared to 3% of children in the timely AR group who were overweight and none of them were obese ($p=0.009$).

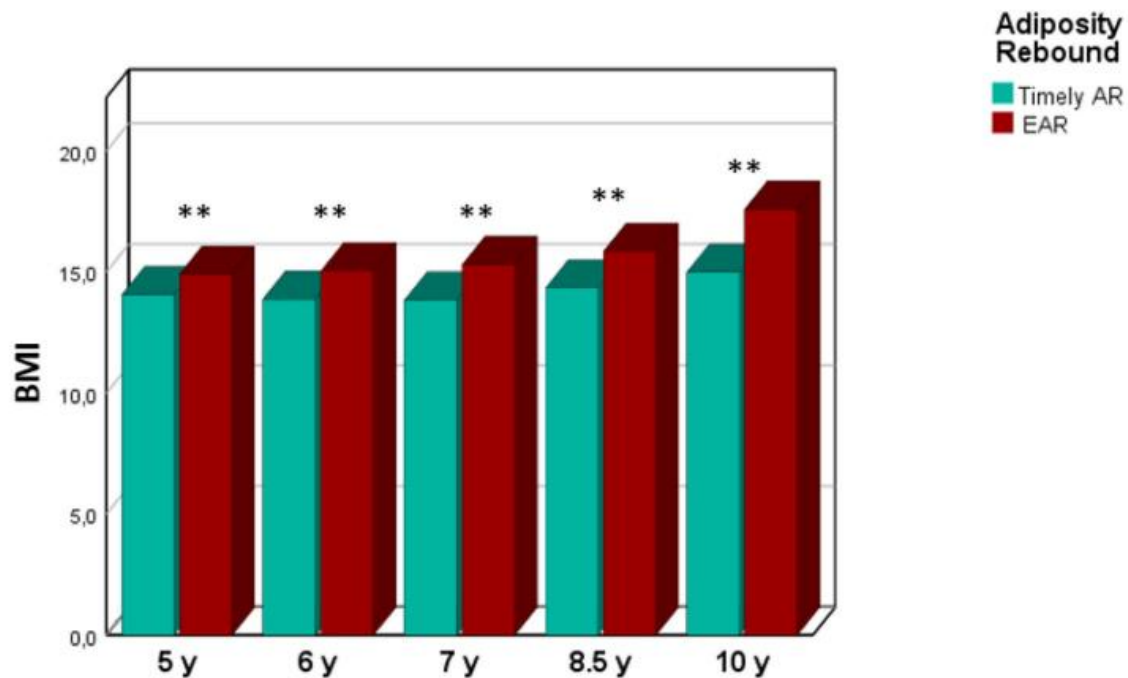


Figure 1. Results of mean BMI values in children with early adiposity rebound (EAR) and timely adiposity rebound (AR).

Discussion

This was the first study investigated EAR prevalence in a group of ex preterm ELBW children and the prevalence of EAR in this cohort was greater than that found in the general population. A significant association between EAR and an increased risk of overweight and obesity at the ages of 6, 7, and 10 years was found in the study. According to the findings, there was a consistent and significant difference between the risk of overweight and obesity in children with EAR and other children throughout time. At 4 years of age, children with EAR had higher systolic pressure levels than those in the timely AR group. The results of this study indicated that the probability of developing EAR was higher in patients who were discharged from the NICU as exclusively or partially formula fed. The present study showed that, 40.6% developed EAR and 21.5% showed it before 4 years of age.¹ According to Nakayama et al., 38% of the newborns included in the analysis that were classified as very low birth weight (VLBW; birth weight less than 1500 g) had EAR.³ Lin et al. reported that children who were breastfed for more than 4 months had later AR than their counterparts who had not been breastfed or had not been breastfed for a shorter period of time, which included both term and preterm newborns.⁴

Conclusion

Higher percentage of preterm ELBW infants in this cohort developed EAR. In addition to prematurity and its associated consequences, EAR may represent an additional risk factor for adverse metabolic outcomes in this already at-risk population.

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Case report on Rhabdomyosarcoma of the gallbladder in a child

Introduction

Rhabdomyosarcoma (RMS) is the most prevalent soft tissue sarcoma in children which develops from mesenchymal cells. Annually, there were 4.5 cases of this tumour for every million children and adolescents. The primary location of occurrence were the head and neck regions, the genitourinary tract, and the extremities.¹ Hepatobiliary RMS was a rare form of RMS in children, accounting about 0.5% of cases which usually arise from common bile duct (CBD).² RMS of the biliary tree can lead to cholestasis.¹ This case report described a 5 years old male with a gallbladder RMS.

Gallbladder Rhabdomyosarcoma should be considered in the differential diagnosis of pediatric patients who presented with gallbladder mass.

Case presentation

A 5-year-old boy had a complaints of recurring right upper abdominal pain over a two-week period. Vital signs were stable. About 2.7×1.8 cm mass in the gallbladder was discovered during an abdominal ultrasound (US), and contrast-enhanced computed tomography (CT) confirmed the finding (Figure 1). Only the gallbladder contained the mass. Liver was in normal and there was no dilatation of the intra- or extrahepatic biliary ducts. A preliminary diagnosis of a gallbladder neoplastic lesion was taken into consideration. Laboratory data revealed a hemoglobin of 113g/L, a WBC of 12.9×10^9 /L, and a platelet count of 296×10^9 /L. The results of the liver function tests were AST 27 U/L, ALT 12U/L, total bilirubin 3.6 μ mol/L, total protein 69.1 g/L and albumin 46.6 g/L. Hepatitis B antigen was negative. A well-defined heterogeneous mass at the gallbladder's neck was seen on a magnetic resonance cholangiopancreatography (MRCP) scan with no biliary tree dilatation, gallbladder wall thickening, or invasion of surrounding structures. Due to the condition, it was decided to

proceed with a laparoscopic cholecystectomy. The final pathology report revealed a grape-like $3 \times 2 \times 1.5$ cm gelatinous mass in the gallbladder neck that did not invade the gallbladder's serosa. Final diagnosis was a gallbladder botryoid RMS. PET (positron emission tomography) performed after surgery revealed no evidence of metastases. Chemotherapy with vincristine, cyclophosphamide, actinomycin-D at two week's interval for 11 cycles was done. After completion of chemotherapy there was no evidence of residual, active disease.

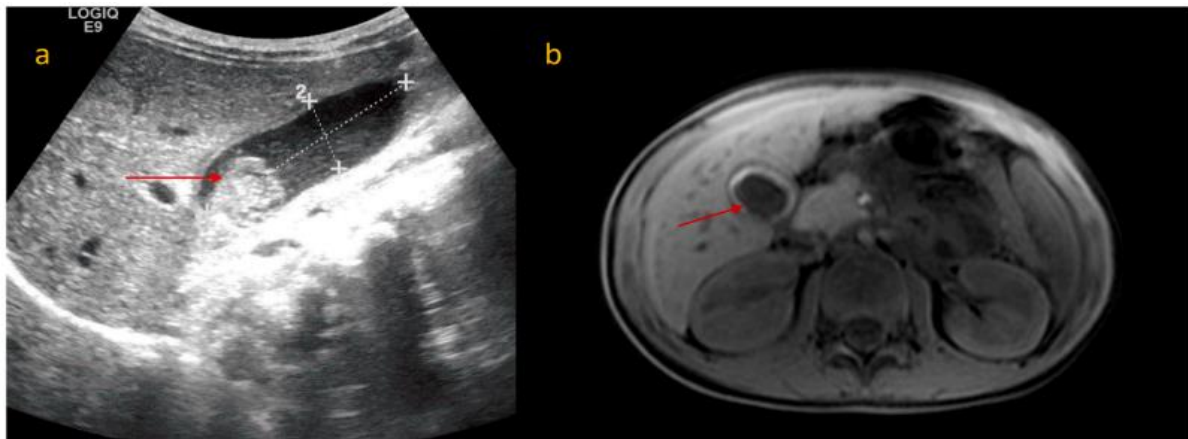


Figure 1. (a) Abdominal ultrasound measuring 2.7×1.8 cm mass in the gallbladder. (b) CT scan showing mass in the neck of the gallbladder

Discussion

Gallbladder RMS has been reported rarely in pediatric patients. Obstructive jaundice was the typical presentation of gallbladder RMS, and it may be accompanied by fever, vomiting, and stomach pain. In 1982, Mihara et al. reported the first case of a child who had gallbladder RMS, who presented with obstructive jaundice and fever. Patient in the present case had an abdominal pain which on investigation with abdominal ultrasound (US) and contrast-enhanced computed tomography (CT) revealed a 2.7×1.8 cm mass located in the neck of gallbladder. According to Intergroup Rhabdomyosarcoma Study Group (IRSG), the standard chemotherapy for gallbladder RMS includes vincristine, actinomycin, and cyclophosphamide.¹ A similar case report was described in which a 4 years old female with epigastric abdominal pain was diagnosed having botryoid RMS wherein the patient underwent cholecystectomy.²

Conclusion

The diagnosis of gallbladder RMS was challenging due to its rare occurrence. In the differential diagnosis of paediatric patients presenting with a gallbladder mass, gallbladder RMS should be taken into account.

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