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Original Research Article

Study of aetiological profile, clinical presentation and outcome of hepatosplenomegaly in children between 1 month and 14 years of age

Jyotiranjan Champatiray[1]*, Debasish Panigrahi[2], Dipankar Mondal[1], Saroj Kumar Satpathy[1]

[1]Department of Pediatrics, Sriram Chandra Bhanj Medical College and Hospital Cuttack, Odisha, India
[2]Department of Pediatrics, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

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***Correspondence:**
Dr. Jyotiranjan Champatiray,
E-mail: jrcray@rediffmail.com

ABSTRACT

Background: Hepatosplenomegaly is the simultaneous enlargement of liver and spleen. Hepatosplenomegaly is a sign seen in various disease processes in infants and children. So, an attempt was made in the present study to know the various etiological factors and clinical features and clinical outcome of hepatosplenomegaly in the cases admitted in SVPPGIP and SCB Medical College and Hospital, Cuttack.
Methods: A tertiary care hospital based prospective study was carried out in 150 children between1 month to 14 year of age for a period of 2 years.
Results: The most common presenting features was anemia (79.3%) followed by fever (78%) and jaundice (38.7%). Infectious (50%) causes are commonest aetiology of hepatosplenomegaly followed by haematological (36%) and congestive (6%) causes. Infectious etiology was commonly constituted by malaria (25.2%) due to high prevalence of malaria in rural Odisha. Mortality is significant in infectious and congestive aetiologies among younger age groups whereas haematological causes have favorable outcome.
Conclusions: A detailed history and thorough physical examination should be carried out in every case of hepatosplenomegaly to reach a diagnosis and determine further management plans. Since clinical outcome of children with infectious and congestive aetiologies are overwhelmingly poor, it can be improved by intervention at earliest time possible and aggressive treatment.

Keywords: Hepatosplenomegaly, Malaria, Splenomegaly

INTRODUCTION

Hepatosplenomegaly is the simultaneous enlargement of the liver (hepatomegaly) and spleen (splenomegaly).[1] Hepatosplenomegaly is a common finding in infants and children with various etiological factors. Hepatosplenomegaly is a sign seen in various disease processes.[2] Normal liver size estimation are based on age related clinical indices like the degree of the clinical extension of the liver edge below the right costal margin, the span of dullness to percussion, the length of vertical axis of the liver as estimated from imaging techniques.[3] Hepatomegaly is defined as when the liver span is more than the expected for corresponding age. Similarly, splenomegaly is defined as presence of palpable spleen below left costal margin.[4]

Liver is regarded as chemical factory of the body.[5] Liver is enlarged either due to primary disease of liver or as part of systemic disease. Various mechanisms are attributed to result in hepatomegaly like inflammation (infectious agents, collagen vascular diseases), infiltration (primary or secondary neoplasms), increased size of vascular spaces (hepatic vein obstruction or supra hepatic obstruction), increased size of billiary spaces (billiary

atresia, choledochal cyst), proliferation of hematopoietic cells (congenital haemolytic anemias), proliferation of kuffer cells (septicaemia), abnormal storage of various metabolites (lipid, glycogen) etc.[6-8]

Similarly, spleen in infant and children is involved in variety of pathological process. Some of these processes cause isolated splenomegaly where as other involve spleen as a part of systemic illness. Enlargement of spleen may result from increase in its vascular space (congestive splenomegaly), inflammation (infection, collagen disease), infiltration (primary or secondary neoplasm), storage disorders etc.[9]

So, when a child is found to have hepatosplenomegaly all the other signs and symptoms should be taken in to account in order to narrow the diagnosis and do necessary work up in that line. So, clinical findings like jaundice, anemia, lymhadenopathy, pyrexia, ascites, arthritis, rashes, nephromegaly, cardiomegaly, malabsorption, mental retardation, seizure etc. should be carefully examined in order to suspect the etiology. An attempt was made in the Present study to know the various etiological factors and clinical features and clinical outcome of hepatosplenomegaly in the cases admitted in SVPPGIP and SCB medical college and hospital, cuttack.

The objective of the study was to the possible etiology, clinical presentation and outcome of children from 1 month to 14 years of age with hepatosplenomegaly admitted in paediatric ward of SCB MCH and SVPPGIP, Cuttack.

METHODS

Source of data

Total 150 Children from 1 month to 14 years of age with hepatosplenomegaly admitted in paediatric wards of SCB medical college and hospital and SVPPGIP over a period of one year were from 30.06 2015 to 29.06 2016 included in the study.

Type of study

Prospective observational tertiary care hospital based time bound study.

Inclusion criteria

- Children more than 1 month of age but less than 14years of age who were admitted with hepatosplenomegaly are included in the study.
- Hepatomegaly is defined as when the liver edge is palpated below the right costal margin in the midclavicular line for infants and older children and the liver span is more than expected for the corresponding age which is for infants more than 5-6cm, for 1-5yrs more than 6-8cm, for 5-10yrs more than 8-9cm, for 10-14yrs more than 8-12cm.[9,10]
- Splenomegaly is classified in to three grades on clinical ground as Mild (1-3cms), moderate (4-7cms) and massive (more than 7cms).[11]

Exclusion criteria

- Infants less than 1 month of age and Children more than 14 years of age are excluded from this study.
- Those children presented with pushed down liver due to various causes are excluded by measuring liver span and comparing it for that particular age.

Data collection

A structured questionnaire was designed to seek information related to socio-demographic profile, relevant symptoms, physical examination findings and relevant investigation findings like complete blood count, comment on peripheral smear, ESR, CRP, urine analysis, stool examination, chest x ray was performed in all cases. Investigations like widal test, HIV ELISA, Hepatitis profile, Malaria Parasite, liver function test, bleeding time, clotting time, prothrombin time, Hb electrophoresis, blood culture, Mantoux test, Xray skull, Xray long bones was done in relevant cases depending upon the provisional diagnosis made on history and clinical examination. Special investigations like CT scan, liver biopsy, bone marrow study, HPLC was done in fewer cases where indicated. Day to day progress was observed during the hospital stay and clinical improvement and outcome was studied. Regular follow up was done after discharge. The entire data was collected with the aid of preformed structured questionnaire. The outcome was assessed and was statistically analysed in term of improvement and mortality.

The etiological profile was studied in both age specific and cause specific manner and was statistically analysed. Ethical clearance was obtained from Institutional ethical committee. Written consent was obtained from the parents.

Statistical analysis

Statistical analysis was done by statistical software SPSS for windows version 23. P values were calculated using pearson chi-square test. P <0.05 was considered as significant and p <0.01 as highly significant.

RESULTS

Among 150 children included in present study 1month to 5 years' age group constituted 45.3% (68) followed by 6 years to 10 years and 11 years to 14 years' age group which comprised 41.3% (62) and 13.3% (20) respectively. Males (58.7%) outnumbered females (41.3%). Socioeconomic status revealed 5.3% of children belonged to upper cast whereas upper middle, lower middle, upper lower and lower groups comprised 10.7%, 26.7%, 32% and 25.3% respectively. In the present study,

the clinical features with which children with hepatosplenomegaly (Table1) presented to our facility in both age (Table 2) specific and sex specific manner (Table 3) and the frequency of similar presenting features in a similar study by Somaiah G et al. and Bricks LF et al. are represented in a tabular illustration below (Table 1).[5,6]

Table 1: Clinical presentation of hepatosplenomegaly in all ages.

Sign and Symptoms	Percentage of cases in present study	Percentage of cases by Somaiah G et al.	Percentage of cases by Bricks LF et al.
Fever	78%	80.7%	43.8%
Anemia	79.3%	66.7%	29.2%
Jaundice	38.7%	37.33%	15.7%
Abdominal pain	22.7%	30.67%	14.6%
Abdominal distension	37.3%	18%	-------
Lymphadenopathy	12.6%	20%	10.1%
Oedema	26%	-----	-------
Bleeding	16.7%	------	-------
Breathlessness	22.7%	8%	6.7%

Table 2: Clinical presentation of hepatosplenomegaly in age groups.

Symptoms and signs	1 month-5 years	6 years-10 years	11 years-14years
Fever	54 (79.4%)	44 (71%)	19 (95%)
Anemia	54 (79.4%)	50 (80.6%)	15 (75%)
Jaundice	14 (20.5%)	28 (45.1%)	16 (80%)
Abdominal pain	7 (10.3%)	16 (25.8%)	11 (55%)
Abdominal distension	32 (47%)	18 (29%)	6 (30%)
Lymphadenopathy	11 (16.1%)	8 (12.9%)	0 (0%)
Oedema	22 (32.3%)	11 (17.7%)	6 (30%)
Bleeding	19 (28%)	5 (8%)	1 (5%)
Breathlessness	18 (26.4%)	11 (17.7%)	5 (25%)

Table 3: Clinical Presentation of hepatosplenomegaly in specific sex groups.

Signs and symptoms	Male	Female
Fever	70(79.4%)	47(75.8%)
Anemia	67(76.1%)	52(83.8%)
Jaundice	34(38.6%)	24(38.7%)
Abdominal pain	19(21.5%)	15(24.1%)
Abdominal distension	34(38.6%)	22(35.4%)
Lymhadenopathy	11(12.5%)	8(12.9%)
Oedema	25(28.4%)	14(22.5%)
Bleeding	17(19.3%)	8(12.9%)
breathlessness	24(27.2%)	10(16.1%)

In our study, the aetiological profile of children with hepatosplenomegaly and the frequency of the same in similar study by Somaiah G et al. are represented.[5] (Table 4).

The major etiologies of hepatosplenomegaly in children in our study can be compared to results of similar study conducted by Bricks LF et al. and Ali N et al.[13,14] as follows (Table 5). In our study, death was maximum in congestive causes (55.6%) which was statistically significant demonstrated by p value of 0.002 followed by infectious causes (22.7%) which was also statistically significant demonstrated by p value of 0.001 (Table 6) whereas death was minimum in haematological causes (0%) which was also statistically significant represented by p value of 0.001 whereas all the cases of connective tissue diseases were referred. In our study, the clinical outcome of various aetiological profile in specific age groups were also determined and their statistical significances were evaluated and represented in form of p value. It clearly demonstrates that the incidence of death is maximum among 1 month to 5 years of age with infectious aetiology with significant statistical association as represented by their significant p value of 0.002 whereas similar association with other age groups cannot be statistically derived.

Similarly, the incidence of death was minimum in 1 month to 5 years of age with haematological aetiologies which is statistically significant as represented by p value of 0.002 whereas similar association cannot be derived statistically in other age group. The incidence of death is maximum in 6 years to 10 years of age with congestive

aetiology which is statistically significant as represented by p value of 0.004 whereas similar association cannot be documented in other age groups. All the cases of connective tissue diseases in 6 years to 10 years of age are referred which is also statistically significant. Even if the clinical outcome of different age groups in rest other aetiologies have been described, the statistical significance of these associations cannot be determined.

Table 4: Etiology of hepatospenomegaly in all ages.

Aetiology	Diseases	Percentage of cases in present study	Percentage of cases in study by Somiah g et al
Infective		50%	68%
	Malaria	25.2%	29.33%
	Viral hepatitis	6.2%	11.33%
	Tuberculosis	2.6%	6.67%
	Septicemia	16%	2.7%
Haematological		36%	22.67%
	Thalassemia	14.6%	11.33%
	Sickel cell anemia	9.3%	8.7%
	Sickel thalassemia	4%	--------
	Leukemia	8.1%	--------
Congestive		6%	3%
	Congestive cardiac failure	5%	--------
	Infective endocarditis	1%	--------
Connective tissue disease		4%	2%
	Systemic onset juvenile idiopathic arthritis	4%	2%
Storage disease		1.3%	2%
	Glycogen storage disease	0.6%	-------
	Mucopolysaccharidosis	0.6%	1.33%
Miscellaneous		3.3%	3.3%
	Wilson's disease	1.3%	-------
	Sever acute malnutrition	2%	2%

Table 5: Etiology and comparison.

Aetiology	Percentage of cases in our study	Percentage of cases in study by Bricks et al	Percentage of cases in study by Ali N et al
Infective causes	50%	47.2%	14%
Haematological causes	36%	39.3%	73%
Congestive causes	6%	3.3%	------
Connective tissue disease	4%	--------	
Storage disease	1.3%	8%	9%
Malignancy	8.1%	6%	18%

Table 6: Outcome of children with hepatosplenomegaly.

Aetiology	Cure	Death	Referral	*p value
Infectious causes	58(77.3%)	17(22.7%)	0(0%)	0.001
Haematological causes	42(77.7%)	0(0%)	12(22.3%)	0.001
Congestive causes	4(44.4%)	5(55.6%)	0(0%)	0.002
Connective tissue disease	0(0%)	O (0%)	6(100%)	0.001
Storage disorders	2(100%)	0(0%)	0(0%)	0.692
Miscellaneous	4(80%)	1(20%)	0(0%)	0.603

*p value-pearson chi-square test applied

In our present study, we have determined that the incidence of death is very much less if the patient presented at early course of disease (Figure 1) which increases significantly (1 death in less than 3 days of illness vs 22 deaths after 3 days of illness) if the patient presents at later period of illness which is statistically significant represented by p value of 0.001. Duration of hospitalisation of children is shown in Figure 2. The

mean duration of hospitalization in the studied group was 1.76 days with standard deviation of 0.7.

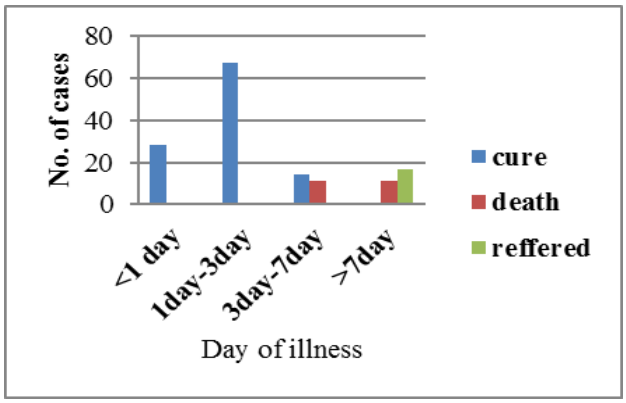

Figure 1: Clinical outcome of children with hepatosplenomegaly in relation to the day of illness at the time of presentation.

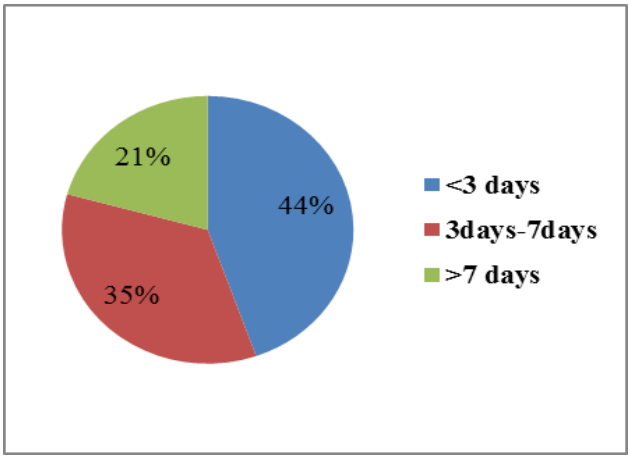

Figure 2: Duration of hospitalisation in children with hepatosplenomegaly.

DISCUSSION

In our study fever, pallor and jaundice are common presenting symptoms whereas pyrexia, anemia, icterus, abdominal distension, oedema, lymhadenopathy and respiratory distress are common examination findings in children with hepatosplenomegaly. Similar presentation was found by Somaiah G et al and Bricks et al.[12,13] The greater incidence of anemia in our study is due to greater prevalence of haemolytic anemia in our population group. Infectious causes are commonest etiology followed by haematological and congestive causes in our study. Among infectious causes commonest being malaria followed by septicaemia. Similar observation was found by Somiah G et al, Bricks et al.[12,13] Ali N et all found that most common etiology was haematological followed by malignancy and infective.[14] Somiah G et al found that most common infectious etiology was malaria followed by viral hepatitis.[12]

There is greater prevalence of storage disorders and malignancies and haematological causes in other studies compared to our studies where as there is greater incidence of infectious causes in our studies than their studies. This is in accordance with the fact that the relative incidence of the cause of hepatosplenomegaly is subject to geographical and ethnic variation.[15] In western countries, the malignancies and haematological causes account most of the cases where as in tropical countries like us the incidence of such causes is swamped the greater preponderance of tropical infectious disease like malaria.[16]

Mortality is significant in infectious and congestive aetiologies among younger age groups whereas haematological causes have favourable outcome in our study. Till now no study has been done to compare the outcome. The poor outcome of infectious causes and congestive causes can be attributed to the fact that the delay in referral and the serious symptoms with which these children presented to our facility and also virulence of the disease. Mortality is significant for the children who present lately whereas earlier presentation has favourable outcome.

CONCLUSION

When a child present with hepatosplenomegaly, its clinical presentation and probable aetiology generally correlates very closely, hence a detailed history and thorough physical examination should be carried out in every case to reach a diagnosis and determine further management plans. Since, clinical outcome of children with infectious and congestive aetiologies are overwhelmingly poor, it can be improved by intervention at earliest time possible and aggressive treatment. For example, in septicemic patients immediate hospitalisation and promptly treating the offending organisms with antibiotic prophylactically as per sensitivity pattern prevalent in that locality before the culture report available (as in our case combination of Vancomycin and Amikacin) can dramatically alter the disease course and outcome. Since, the clinical outcome of patients who presented lately is much poorer than those presented earlier, the greater degree of suspicion and quick referral can improve the outcome significantly. It can be achieved by seeking medical attention early after onset of symptoms by patients, identification of hepatosplenomegaly by simple bed side clinical procedure, earlier referral of sick cases and cases with aggressive symptoms to tertiary health care centres by physicians of primary and secondary health care centres. For conditions like storage disorders, connective tissue diseases and leukemias, a greater degree of suspicion regarding these conditions and proper work up and early referral to respective specialized centres is mandatory so that it will improve the short-term mortality and long term morbidity of these patients. Since, the younger age group children are more prone to unfavourable outcome, special attention should be directed to these children.

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