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Research Article

Impact of IVIG Treatment in Decreasing the Average Length of Stay in Patient with BACM (Benign Acute Childhood Myositis): A 5 Years Experience

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Abstract

Background: Benign acute childhood myositis BACM is a self limited sudden onset of lower extremity pain and refusing to walk which considered a highly concerning sign to the parents. The primary complaint of pain in the calves in child presenting with a history of recent viral illness should bring BACM to the fore front of clinicians minds. Abrupt onset of severe lower leg pain occurs at a median of 3 days as the initial viral illness resolves.

Objective: In our study we want to explore that the treatment of BACM with IVIG (Intravenous immunoglobulin) will leads to decrease the estimated length of hospital stay to less than 2 day with a rapid recovery of walking difficulty without complications and with a high parental satisfaction among children presented with inability to walk in HBTGH.

Methods: We conducted a retrospective study on all the children admitted at Hotat Beni Tamim General Hospital at Saudi Arabia with the diagnosis of BACM and treated with IVIG (0.5 G/KG). In the last 5 years (from January 2019 to March 2024), the medical records of children diagnosed with BACM admitted were reviewed retrospectively. The following variables were retrieved from their electronic files: age, sex, prodromal symptoms, presenting symptoms, initial CPK level, follow up CPK level, total leukocytic count, length of stay, management with IVIG.

Results: Increased CPK level in (100%) ranging from 605 to 6410 U/L the median value of CPK at the peak was 1149 UI/L with a follow up decrease with median number 159 UI/L (normal CPK level < 150 UI/L). The p-value was 0.0001297 indicate that there is a significant difference between the CK-level and follow-up CK-level. Estimated length of stay was 1.9 days, in comparison with most literature 4 - 5 days. In our study all patients were treated with IVIG 0.5 G/KG one dose 10 cases (59%) and 2 doses 7 cases (41%).

Conclusion: Our study over 5 years and from 17 cases diagnosed as BACM demonstrated that our demographic results is like other studies but what is exciting in our study that our management of these cases with one or two doses of IVIG associated with a dramatic improvement in the child symptoms and without complications which has a great impact on the child and family satisfaction. And also by decreasing estimated length of stay to less than two days that reflects on a decrease in hospital acquired infection, and the overall patient cost.

Keywords: *Benign Acute Childhood Myositis BACM; Viral Illness; Prodromal Symptoms*

Introduction

Benign acute childhood myositis (BACM) is a muscle disorder that may accompany children's acute infections. It was first described 60 years ago by the Swedish pediatrician Lundberg as myalgia cruris epidemic [1] and may occur as an epidemic or sporadic disease. Influenza viruses have been most frequently associated with epidemic forms; among them, influenza B appears responsible for more cases than influenza A [2]. It is characterized by severe calf pain and tenderness and inability to walk, preceded by symptoms of upper respiratory tract infection. It mainly affects school age boys and associated with viral agent like influenza virus, with high prevalence in winter and spring. Also, there are reported cases associated with mycoplasma and dengue virus [3]. The disease tends to be prevalent in the late winter and early spring. school-aged boys are more commonly affected. Clinical manifestation may vary from mild myalgia to rhabdomyolysis and the most frequent presentation is bilateral calve's pain following an acute flu-like illness. Typical laboratory alterations related to BACM are an increase in serum creatinine phosphokinase levels, Aspartate aminotransferase AST, CRP, with or without leukopenia, both immune-mediated processes and direct pathogen muscle invasion are supposed to be the underlying mechanisms of benign myositis (Table 1).

Differential diagnosis inculdes:
1- Trauma or nonaccidental injury.
2- Guillain-Barre syndrome.
3- Rhabdomyolysis.
4- Osteomyelitis.
5- Deep vein thrombosis.
6- Juvenile Rheumatoid arthritis.
7- Malignancy.
8- Dermatomyositis.
9- Polymyositis.
10- Muscular dystrophy.
11- Intracranial pathology.

Table 1: *DD of acute inability to walk.*

Management historically consists of symptomatic supportive treatment including (IV hydration to promote muscle enzyme clearance) and analgesia. The most important complication is rhabdomyolysis, which may result in acute kidney injury secondary to myoglobinuria. in case of very high CPK level > 6000 IU/L or recurrent episodes of myositis we have to consider either an inherited or metabolic muscle diseases.

Methods

We conducted a retrospective study on all the children admitted at Hotat Beni Tamim General Hospital at Saudi Arabia with the diagnosis of BACM and treated with IVIG (0.5 G/KG). In the last 5 years (from January 2019 to March 2024), the medical records of children diagnosed with BACM admitted were reviewed retrospectively. The following variables were retrieved from their electronic files: age, sex, prodromal symptoms, presenting symptoms, initial CPK level, follow up CPK level, total leukocytic count, length of stay, management with IVIG. The inclusion criteria were as follows: acute onset of inability to walk, presence of calf muscle pain or tenderness, gait disturbance and increased serum CPK level. The exclusion criteria were as follows: family history of muscle diseases, presence of neurological abnormalities in the clinical examination and presence of concurrent immune complex disease.

Results

From total 30 cases presented with sudden inability to walk 17 cases (57%) are diagnosed as BACM. In our study the mean age was 5 years and the range of age of patients was from 2 to 11 years and this is similar to the published reports in the medical literature. Most of patients were preschool age 47% from 5 - 7 years (Figure 1). Male gender 16 (94%), female 1 (6%) this male predominance may be due to either greater level of activity in males or genetic predisposition (Figure 2) prodromal symptoms included: fever (29%) (Figure 3) previous URTI (71%) (Figure 4). All the patients presented with inability to walk (100%).

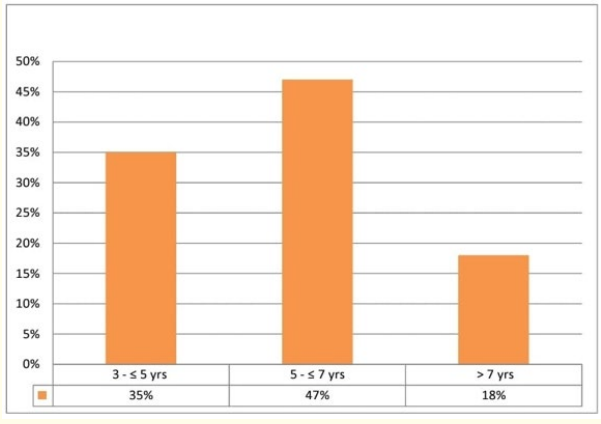

Figure 1: *Showing predominance of BACM cases among preschool age.*

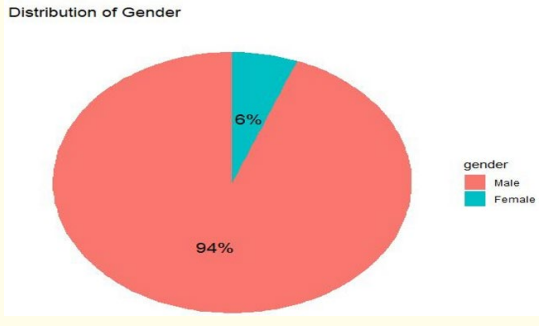

Figure 2: *Male predominance among BACM patients.*

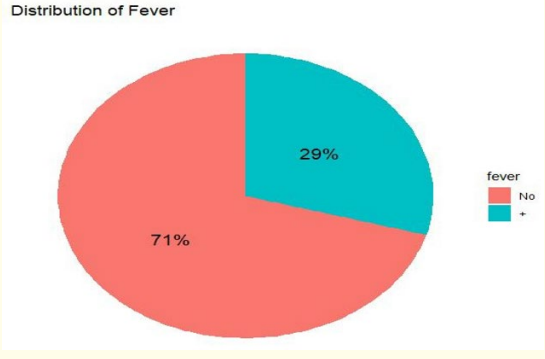

Figure 3: *Presentation of fever among BACM patients.*

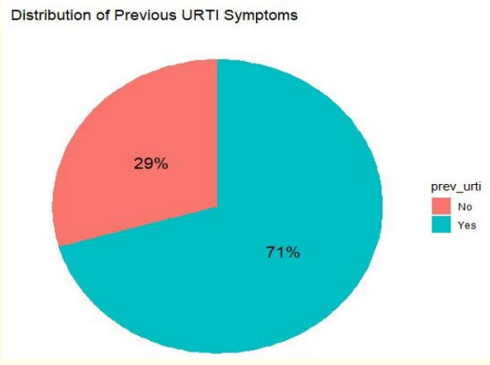

Figure 4: *Distribution of URTI among BACM patients.*

Laboratory finding increased CPK level in (100%) ranging from 605 to 6410 U/L the median value of CPK at the peak was 1149 UI/L with a follow up decrease with median number 159 UI/L (Normal CPK level < 150 UI/L) (Figure 5). The p-value was 0.0001297 indicate that there is a significant difference between the CK-Level and follow-up CK-Level. Leukopenia associated with 5 cases (29%) wbc < 4000m^3. Estimated length of stay was 1.9 days, in comparison with most literature 4 - 5 days [1]. In our study all patients were treated with IVIG 0.5 G/KG one dose 10 cases (59%) and 2 doses 7 cases (41%) (Figure 6).

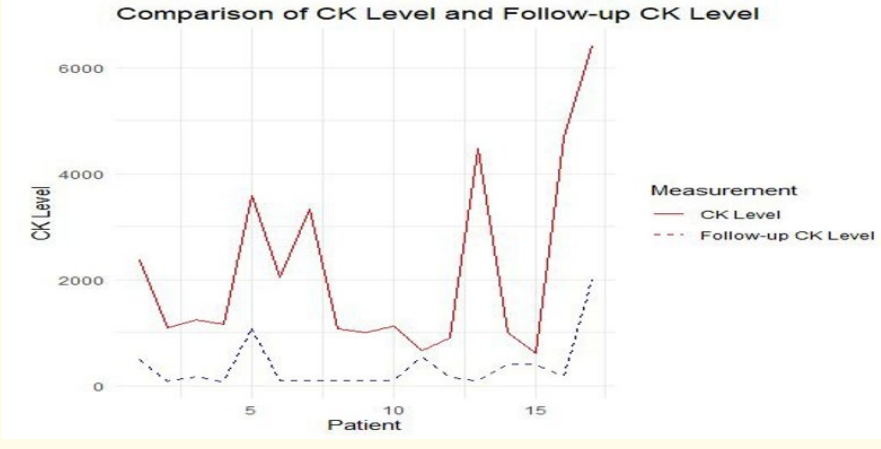

Figure 5: *Initial vs follow up CK level.*

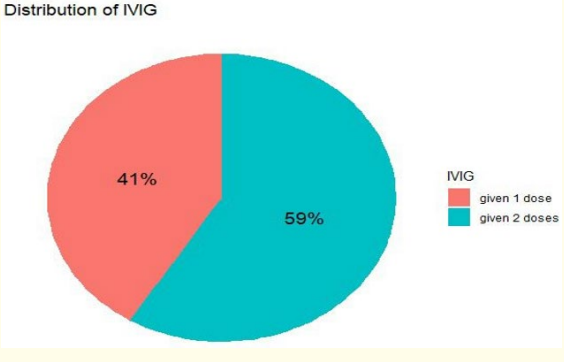

Figure 6: *Management of BACM with IVIG.*

Discussion

Benign acute childhood myositis (BACM) is a muscle disorder that may accompany children's acute infections. It was first described 60 years ago by the Swedish pediatrician Lundberg as myalgia cruris epidemic [1] and may occur as an epidemic or sporadic disease. Influenza viruses have been most frequently associated with epidemic forms; among them, influenza B appears responsible for more cases than influenza A [2]. It is characterized by severe calf pain and tenderness and inability to walk, preceded by symptoms of upper respiratory tract infection. It mainly affects school age boys and associated with viral agent like influenza virus, with high prevalence in winter and spring. Also, there are reported cases associated with mycoplasma and dengue virus [3]. Benign acute childhood myositis BACM is self-limited childhood illness typically affected boys [4], as shown in our study 94% (16 cases) of the patients were boys which is consistent with other study, the cause of male predominance is unexplained but it could be related to their greater activities or may be caused by genetic predisposition [5].

The reported median age of BACM is 9 years [6], in our study the median age was 5 years and the range of age of patients was 2 to 11 years and this is similar to the published reports in the medical literature. Most of patients were preschool age 47% from 5 - 7 years.

The clinical presentation of our children was typical: acute onset of symmetrical calf muscle pain or hip pain that results in the inability or refusal to walk in 100% of the patients, 29% presented with fever and 71% had prodromal symptoms (URTI) before the presentation that indicates viral predisposition as other publications [7].

In our study laboratory finding showing leukopenia associated with 5 cases (29%) WBC < 4000 mm^3. increased CPK level in (100%) of cases with median value of CPK at the peak was 1149 UI/L with follow up decrease with median number 159 UI/L (normal CPK level < 150 UI/L) at time of discharge with p-value associated with the test is 0.0001297 indicate that there is a significant difference between the CK-Level and Follow-up CK-level.

In our study all patients were hospitalized and treated with intravenous hydration and analgesics as necessary. In addition to IVIG 0.5 G/KG one dose 10 cases (59%) and 2 doses 7 cases (41%). During the hospitalization myoglobinuria never occurred in any patient. Mean duration of hospitalization was 1.9 days. Length of stay was less than other literature which was 4 - 5 days [8], all patients discharged home and follow up in pediatric clinic. All children revealed clinical and laboratory improvement. No patients had any residual muscular impairment.

In the pediatric age, viral myositis is the most common recognized cause of rhabdomyolysis and the most dangerous sequela of rhabdomyolysis with myoglobinuria is acute renal failure [9]. Data on pediatric population are limited and predictive factors to determine the evolution to acute renal failure are still lacking. However, in our series, even cases with massive CK increase did not present myoglobinuria nor acute renal failure [10], supporting that treatment with IVIG decreasing sequalae of the disease in addition to decrease average length of stay and hospital acquired infection and therefore decreasing hospital cost and finally have a good impact on patient and family satisfaction.

Conclusion

Our study over 5 years and from 17 cases diagnosed as BACM demonstrated that our demographic results is like other studies but what is exciting in our study that our management of these cases with one or two doses of IVIG showing a dramatic improvement in the child symptoms (ability to walk) and without complications which has a great impact on the child and family satisfaction. And also by decreasing estimated length of stay to less than two days that reflects on a decrease in hospital acquired infection and the overall patient cost.

Bibliography

1. Giacomo Brisca., *et al*. "Management and outcome of benign acute childhood myositis in pediatric emergency department". *Italian Journal of Pediatrics* 47 (2021): 57.

2. Lundberg A. "Myalgia cruris epidemica". *Acta Paediatrica* 46.1 (1957): 18-31.

3. Rennie LM., *et al*. "Benign acute childhood myositis in an accident and emergency setting". *Emergency Medicine Journal* 22.10 (2005): 686-688.

4. Koliou M., *et al*. "A case of benign acute childhood myositis associated with influenza A (H1N1) virus infection". *Clinical Microbiology and Infection* 16.2 (2010): 193-195.

5. Federica Attaianese., *et al*. "Benign acute children myositis: 5 years experience in a tertiary care pediatric hospital". *European Journal of Pediatrics* 182.10 (2023): 4341-4349.

6. Hyczko AV., *et al*. "A crawling case of benign acute childhood myositis". *SAGE Open Medical Case Reports* 9 (2021): 10.

7. A Costa Azevedo., *et al*. "Benign acute childhood myositis: A 5-year retrospective study". *Archives de Pédiatrie* 29.7 (2022): 490-493.

8. Sabine Mall., *et al*. "A large outbreak of influenza B-associated benign acute childhood myositis in Germany, 2007/2008". *The Pediatric Infectious Disease Journal* 30.8 (2011): e142-e146.

9. Mannix R., *et al*. "Acute pediatric rhabdomyolysis: causes and rates of renal failure". *Pediatrics* 118.5 (2006): 2119-2125.

10. Korinthenberg R., *et al*. "Diagnosis and treatment of Guillain-Barré syndrome in childhood and adolescence: an evidence- and consensus-based guideline". *European Journal of Paediatric Neurology* 25 (2020): 5-16.

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