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Treatment of Sydenham Chorea in Mozambique

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Abstract

Background: Sydenham Chorea (SC) remains a common disease entity in low and middle income countries. There is a need for a structured treatment protocol and adequate follow up in these countries. **Methods:** In this study, 23 patients diagnosed with SC from the Maputo Central Hospital, Mozambique, were treated with a standardised protocol (penicillin and prednisolone in the acute phase and monthly benzathine penicillin in the follow up). **Results:** At presentation, in addition to the typical symptoms of SC, mitral and/or aortic valve problems were present in 45% of the patients and one presented with carditis. With this treatment protocol, 82% of patients were symptom free at the last follow up. In four children, a recurrence was seen during follow up and this could be explained by low treatment compliance. **Conclusions:** With the standard treatment protocol, the majority of patients were cured. To avoid recurrences of SC, a better follow up program should be advocated.

Keywords: Sydenham Chorea, Jones criteria, Anti-streptolysin O

Introduction

Chorea is characterised by involuntary and uncoordinated movements, with Sydenham Chorea (SC) being the most commonly acquired chorea in childhood [1, 2, 3, 4] and a possible neurological manifestation of rheumatic fever [1, 5]. Sydenham Chorea is now considered to be one of the post-streptococcal movement disorders. It is an autoimmune Central Nervous System (CNS) disease that occurs in response to an infection with group A β-hemolytic Streptococcus. It usually occurs in children aged 5–15 years and girls are more commonly affected [1, 6, 7, 8].

In Mozambique, a low-middle income country, with a high rate of poverty, poor housing conditions and a lack of medical resources, school aged children are affected quite frequently by this disease, probably due to a high incidence of throat infections which are not diagnosed in time and not adequately treated. Early and adequate treatment of SC is necessary for an improved outcome, to prevent cardiac morbidity, to minimise school delays and to get children back to their normal lives as early as possible.

The objective of this study is to describe the SC cases in children and adolescents admitted to the paediatric neurology unit of Maputo Central Hospital (HCM) in Mozambique, from September 2013 to January 2019. At the hospital, a standard protocol for diagnosis and treatment of SC was systematically applied, and this case series will evaluate treatment and outcomes based on this standard protocol.

Methods

This is a descriptive retrospective study. Data were collected from the clinical files of 23 patients who were admitted to the paediatric neurology unit of the HCM, from September 2013 to January 2019. One patient was excluded because he left the hospital during the first 24 hours of hospitalisation. For the diagnosis of SC, a full clinical paediatric and neurological exam was conducted. A history of recent (up to one month before the onset of symptoms) throat or cutaneous infections was documented, as well as the presence of cardiac symptoms. To diagnose possible rheumatic fever, the Jones criteria were used [3, 6, 8, 9]. For the major clinical symptoms, we consulted the criteria which were summarised in the papers of Walker et al. [4, 10]. In addition, laboratory tests were conducted, including an inflammatory panel consisting of Erythrocyte Sedimentation Rate (ESR), Antistreptolysin O antibody titer (ASLO), C-Reactive Protein (CRP), and Rheumatoid Factor (RF). A throat swab, a chest X-ray (CXR), and a cardiac ultrasound exam were also performed (see table 2).

The developed treatment protocol was based on three studies [7, 11, 12]. Crystalline penicillin (400,000–500,000 IU/kg/day) intravenous (IV) for 10 days was administered in the first episode of SC, as well as prednisolone (2 mg/kg/day, with a maximum of 60 mg/day) for 14–21 days, of which 10 days IV (while hospitalised), followed by a tapering schedule with oral tablets, over 8 weeks (see table 1). After 10 days IV penicillin, the first dose of the prophylactic benzathine penicillin intramuscular (IM; 600,000 IU for patients $<$ 30 kg and 1200,000 IU for patients $>$

30 kg) was given in the hospital, with the recommendation to continue the administration of prophylaxis every 28 days until the patient reached 21 years of age. Before the start of the prednisolone treatment, a history was taken of recent possible exposure to tuberculosis. However, none of the patients included in the study had a history of recent exposure to tuberculosis.

Table 1. Treatment protocol for patients diagnosed with Sydenham Chorea (IV = intravenous, IM = intramuscular).

Day of treatment	Medication
Day 1 to 10	IV penicillin 400,000–500,000 IU/kg/day
	IV prednisolone 2mg/kg/day or maximum 60mg/day
Day 11 to 14-21	Oral prednisolone 2mg/kg/day or maximum 60mg/day
Day 14-21 to 60	Tapering off prednisolone (per os)
Day 10	14^{st} dose of IM benzathine penicillin 600,000 IU or 1200,000 IU
Every 28 days	1 dose of IM benzathine penicillin until 21 years of age

Results

The patients ages ranged from 5 years and 3 months to 14 years and 10 months old, with a mean age at diagnosis of 10 years and 4 months. Of the patients, 19 (86.3%) were females. The clinical and laboratory findings are summarised in table 2. The most common clinical findings were chorea and other motor problems, that manifested as cerebellar or extrapyramidal signs (pronator signal, darting/dystonic movements of the tongue, abnormal finger-to-nose test, irregular writing, inability to balance on one leg, inability to count fast up to 10). In one case, a patient presented with arthralgia. Additionally, 22.7% of patients presented with emotional lability. However, emotional status was only assessed qualitatively; no formal neuropsychiatric screening tool was used.

The laboratory tests and cardiac evaluation were not available for all patients included in the study (see table 2). This lack of certain tests was as a result of non-adherence to the protocol or because of missing data in the medical files. The most common laboratory findings were a high ESR, a positive ASLO, an elevated CRP and a positive throat swab. Out of 11 patients tested, the ECG was abnormal in three patients (27%), showing changes related to SC. Additionally, almost half of the patients had cardiac involvement. One patient was diagnosed with carditis and nine had valvular disease (most commonly mitral valve problems, see table 2). This high prevalence of cardiac problems as one of the presenting symptoms, can point to an earlier onset in patients with a post streptococcal disease.

Seventeen patients (77%) completed the 10 days of IV treatment with crystalline penicillin, as prescribed by the protocol. Treatment duration with penicillin was shorter in the other patients. All 22 patients were treated with prednisolone following our protocol and underwent the tapering off schedule during follow up. Furthermore, eighteen patients received benzathine penicillin in hospital. Overall, time to clinical cure or significant improvement was very variable and ranged from 4 days to 6 months after the start of the treatment. Unfortunately, systematic cardiac follow up was not available for all patients.

We evaluated the clinical outcome of our patients after a mean follow up time of 2.5 months (ranging from 1 to 7 months). At the last follow up, 18 patients (81.8%) were clinically symptom free and four (18.1%) still had recurring symptoms. On the whole, we observed a resolution of motor problems in all children at the last follow up. The four patients who had a recurrence of symptoms were females, as was the large majority of the patients in the cohort. The mean time between the first hospitalisation and the recurrence of symptoms was 12.5 months (ranging from 8 to 23 months). The major cause of relapse was noncompliance to prophylaxis with benzathine penicillin [13, 14, 10, 15]. All four patients were readmitted to hospital and were restarted on the prophylaxis with penicillin benzathine. In the follow up after readmittance, no symptoms were reported up to the present day.

Discussion

In this study, patients with SC presented most frequently with motor manifestations and with cardiac involvement in variable degrees. Most of the motor problems observed could be explained by an extrapyramidal or a cerebellar dysfunction and support the data available in the literature [13, 16, 15, 17]. Our protocol is mostly directed at the elimination of infection [4], treatment of immune and inflammatory response [3], and prophylaxis of rheumatic recurrences and rheumatic fever [3, 14].

In our study, treatment following the standard protocol was successful for the majority of patients, with 82% clinically symptom free at the last follow up, and only 18% of patients with recurrences. All of the patients that had recurrences were female and recurrences likely occurred due to non-compliance to the prophylaxis with IM benzathine penicillin. The possible reasons for this non-compliance are that the patients and their caregivers lack understanding of the importance of the long-term prophylaxis and that they have to travel a long distance to the hospital to receive access to the medication. We feel confident these are the most likely reasons for recurrences as we didn't find any other variables associated with recurrence, having considered the severity of the first episode of SC, a short period of crystalline penicillin administration during the first episode [14] and other associated co-morbidities. In other studies, recurrence rates varied from 16 to 60% [3, 11, 12, 14]. Furthermore, noncompliance to the proposed prophylaxis was also seen in other studies. For instance, Dean and Singer [14], and Gilbert [9] confirm that the most frequent reason for relapse is poor prophylactic penicillin adherence. Additionally, Berrios et al [6] show in their paper, that in the absence of effective preventive treatment with antibiotics, recurrence of group A beta hemolytic streptococcal pharyngitis is common, with a sizeable proportion of these indi-

Table 2. Diagnosis parameters for Sydenham Chorea with the number of patients with recorded symptoms indicated for each symptom (↑: elevated, ESR: Erythrocyte sedimentation rate, CRP: C protein reactive, RF: Rheumatoid factor, ASLO: Antistreptoysin O, ECG: Electrocardiogram, CTI: Cardiotoraxic Index).

Clinical signs and symptoms	Laboratory findings	Cardiac findings
1) Infectious/Inflammation	- ↑ ESR- 14/22 (63.6%)	- Chest XR- 1/15 (6.6%) ↑ CTI
- Previous history of skin or throat infection - 3 (13.6%)	- ↑ CRP- 4/13 (30.7%)	- ECG- 3/11 (27.2%) ↑ PR interval
- Polyarthritis - 1 (4.5%)	- Positive RF- 1/15 (6.6%)	- Heart Ultrasound:
- Fever - 1 (4.5%)	- ositive ASLO- 11/20 (55.0%)	Mitral insufficiency- 8/20 (40.0%)
2) Cerebellar symptoms	- Positive Oropharynx swab - 3/8 (37.5%)	Mitral and aortic insufficiency - 1/20 (5.0%)
- Pronator sign- 7 (31.8%)		- Carditis- 1/20 (5.0 %)
- Darting movements of the tongue- 11 (50.0%)		
- Abnormal finger-nose test - 7 (31.8%)		
- Unable to balance on one leg - 16 (72.7%)		
- Inability to count to 10 quickly- 9 (40.9%)		
- Irregular writing- 9 (40.9%)		
3) Emotional lability - 5 (22.7%)		

viduals (20-70%) having suffered from SC relapses. In another study, Gebremariam [18] shows that administration of prophylactic benzathine penicillin G effectively prevents the recurrence of SC.

As the treatment protocol was successful for the majority of patients, we did not consider treating symptomatically motor symptoms or motor incoordination with dopaminergic or GABAergic medications, as mentioned in the paper of Walker [10]. They cite the use of various drugs such as haloperidol, pimozide and risperidone for symptomatic treatment [10]. Importantly, Gurkas et al [3] stress that SC is a self-limiting condition, and that treatment is only necessary for patients for whom chorea is debilitating and protracted.

Because of the retrospective nature of this study, we acknowledge its shortcomings, for instance, that the follow up period was variable and not standardised. Also, the description of the clinical symptoms and laboratory results come from clinical files which were not always complete. Nevertheless, this study reflects the typical medical situation in a low income country with rather limited resources. We show that by following a rather simple and feasible protocol, patients with a rare post-infectious syndrome such as Sydenham chorea can be cured.

Conclusion

This retrospective study shows that the treatment protocol used in the paediatric neurology unit of the HCM is an effective treatment protocol, as most patients were clinically symptom free after adequate acute treatment. In the four cases of recurrence, non-compliance to the chronic prophylaxis was the major cause. Restarting prophylaxis and counseling for adherence to the prophylaxis, was needed to prevent future recurrences. A major challenge of this treatment protocol is convincing patients to continue the monthly IM penicillin injections. Education of health professionals and patients about the importance of adequate and long-term treatment is crucial to prevent prolonged morbidity from Sydenham Chorea.

Abbreviations

SC	Sydenham Chorea
CNS	Central Nervous System
ESR	Erythrocyte Sedimentation Rate
ASLO	Antistreptolysin O antibody titer
CRP	C-Reactive Protein
RF	Rheumatoid Factor

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Competing interests

None.

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References

[1] Cardoso F. Sydenham's chorea. Current Treatment Options in Neurology. 2008;10(3):230-5. **PubMed**.

[2] Sliwa K, Mocumbi AO. Forgotten cardiovascular diseases in Africa. Clinical Research in Cardiology. 2009;99(2):65-74. **PubMed**.

[3] Gurkas E, Karalok ZS, Taskin BD, Aydogmus U, Guven A, Degerliyurt A, et al. Predictors of recurrence in Sydenham's chorea: Clinical observation from a single center. Brain and Development. 2016;38(9):827-34. **PubMed**.

[4] Walker KG, de Vries PJ, Stein DJ, Wilmshurst JM. Sydenham Chorea and PANDAS in South Africa. Journal of Child Neurology. 2014;30(7):850-9. **PubMed**.

[5] RM K, RE B, HB J, Stanton B. Nelson Textbook of Pediatrics 184th Edition (in Portuguese). Pennisylvania: Saunders; 2007.

[6] Berrios X, Quesney F, Morales A, Blazquez J, Bisno AL. Are all recurrences of "pure" Sydenham chorea true recurrences of acute rheumatic fever? The Journal of Pediatrics. 1985;107(6):867-72. **PubMed**.

[7] Garvey MA, Snider LA, Leitman SF, Werden R, Swedo SE. Treatment of Sydenham's Chorea with Intravenous Immunoglobulin, Plasma Exchange, or Prednisone. Journal of Child Neurology. 2005;20(5):424-9. **PubMed**.

[8] Arzimanoglou A, O'Hare A, Johnston M, Ouvrier R. Aicardi's diseases of the nervous system in childhood. 4th ed. London: Mac Keith Press; 2018.

[9] Gilbert D. Hameed B, editor. Sydenham Chorea. UpToDate. ICNA; 2022. [Accessed 25th October 2018]. Available from: https://www.uptodate.com/contents/sydenham-chorea.

[10] Walker KG, Wilmshurst JM. An update on the treatment of Sydenham's chorea: the evidence for established and evolving interventions. Therapeutic Advances in Neurological Disorders. 2010;3(5):301-9. **PubMed**.

[11] Paz JA, Silva CAA, Marques-Dias MJ. Randomized Double-Blind Study With Prednisone in Sydenham's Chorea. Pediatric Neurology. 2006;34(4):264-9. **PubMed**.

[12] Walker AR, Tani LY, Thompson JA, Firth SD, Veasy LG, Bale JF. Rheumatic Chorea: Relationship to Systemic Manifestations and Response to Corticosteroids. The Journal of Pediatrics. 2007;151(6):679-83. **PubMed**.

[13] Al-Eissa A. Sydenham's chorea: a new look at an old disease. Br J Clin Pract. 1993;47(1):14-6. **PubMed**.

[14] Dean SL, Singer HS. Treatment of Sydenham's Chorea: A Review of the Current Evidence. Tremor and Other Hyperkinetic Movements. 2017;7(1):456. **PubMed**.

[15] Demiroren K, Yavuz H, Cam L, Oran B, Karaaslan S, Demiroren S. Sydenham's Chorea: A Clinical Follow-Up of 65 Patients. Journal of Child Neurology. 2007;22(5):550-4. **PubMed**.

[16] Oosterveer DM, Overweg-Plandsoen WCT, Roos RAC. Sydenham's Chorea: A Practical Overview of the Current Literature. Pediatric Neurology. 2010;43(1):1-6. **PubMed**.

[17] Bonthius DJ, Karacay B. Sydenham's chorea: Not gone and not forgotten. Seminars in Pediatric Neurology. 2003;10(1):11-9. **PubMed**.

[18] Gebremariam A. Sydenham's chorea: risk factors and the role of prophylactic benzathine penicillin G in preventing recurrence. Annals of Tropical Paediatrics. 1999;19(2):161-5. **PubMed**.