

# Sydenham Chorea On Indonesian 10 Years Old Boy Caused By Rheumatic Heart Disease : Case Report And Literature Review

*by Laily Irfana*

---

**Submission date:** 27-Nov-2022 08:45PM (UTC+0700)

**Submission ID:** 1964059525

**File name:** Sydenham\_Chorea\_MHSJ.pdf (199.51K)

**Word count:** 3793

**Character count:** 20967

CASE REPORT

**Sydenham Chorea On Indonesian 10 Years Old Boy Caused By Rheumatic Heart Disease : Case Report And Literature Review**

**Laily Irfana<sup>1\*</sup>, M. Permana Airlangga<sup>2</sup>, Nina Devi Indrawati<sup>1</sup>, M. Hanun Mahyuddin<sup>3</sup>**

<sup>1</sup> Department of Neurology, Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia

<sup>2</sup> Departement of Cardiology, Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia

<sup>3</sup> Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

**ARTICLE INFO**

34

**Article history:**

*Received :*

July 22, 2022

*Received in revised form :*

August 18, 2022

*Accepted :*

August 24, 2022

**Keywords:**

*Sydenham chorea*

*Rheumatic heart disease*

*Carditis.*

**\*) Corresponding author:**

irfanalaily@gmail.com

**ABSTRACT**

23

Sydenham's chorea (SC) is one of the manifestations of rheumatic fever, and is the most common cause of chorea in childrens. SC is characterized by involuntary movements such as jerking of the arms, legs, and face. The following case is a 10-year-old boy with complaints of moving his right arm and leg on its own. On physical examination, there was a grade 4/5 systolic murmur at ICS 5 2 cm lateral to the left MCL blowing radiating to the left arm. In ASTO examination there is an increase. CT scan of the head without contrast showed no abnormalities. The results of echocardiography showed severe mitral regurgitation. The patient was diagnosed with Sydenham cholera and rheumatic heart disease. The patient refused hospitalization and was treated as an outpatient with therapy erythromycin 250 mg four times a day for 10 days followed by a twice daily dose for the next 29 months, symptomatic haloperidol 1 mg and trihexyphenidyl 0.5 mg twice a day, aspirin 300 mg four times a day for one month. From this treatment, the complaints improved slowly, and the chorea disappeared within 10 days of the start of treatment.

## Introduction

Sydenham's chorea (SC) is one of the manifestations of acute rheumatic fever. It is characterized by chorea involving the face and extremities and can include psychiatric symptoms, hypotonia and muscle weakness. Although the incidence is decreasing in high-income countries, SC remains the most common cause of childhood chorea, occurring in approximately one-third of patients with acute rheumatic fever.<sup>1</sup> But there are no exact number or prevalence about the Sydenham Chorea incident in Indonesia. Some evidence shows that in developing countries, the incidence of rheumatic fever is higher, presumably due to poor sanitation compared to developed countries.<sup>2</sup>

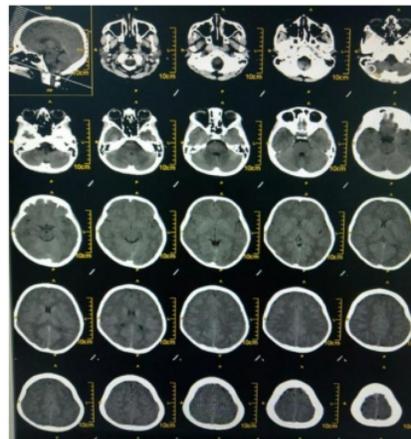
The severity of SC was assessed from mild involuntary movement to severe functional impairment. The involuntary movements that occur during an attack can be repeated from a few minutes to hours, either with breaks between movements or continuously.<sup>3</sup> The patient will experience pain or fatigue due to uncontrolled repetitive movements. Sydenham chorea is a self-limiting disease. However, symptoms can persist for months or years. Sydenham chorea rarely occurs repeatedly.<sup>1</sup>

Various drugs have been used to treat chorea, such as dopamine receptor antagonists (eg, haloperidol), antiepileptic drugs (eg, valproic acid or carbamazepine).<sup>4-8</sup> Studies that examine these drugs in SC patients are very limited and the studies are often observational, objective outcome measures are limited, and the study population is heterogeneous, so the best treatment options are uncertain. We present an Indonesian 10-year-old boy with SC that completely recovered with outpatient management.

## Case(s)

A 10-year-old boy came to the neurology clinic with complaints of moving his right arm and leg on its own. Complaints occurred since one week before being taken to the hospital. The patient has difficulty performing activities due to the movement. There were no complaints of fever, cold cough, shortness of breath, painful swallowing, or joint pain. Normal urination and defecation. There is no history of taking certain drugs.

History of the patient's birth at term. The patient was born by spontaneous vaginal delivery. Birth weight 2900grams, birth length 50cm. Patients completed the mandatory immunizations. Growth and development according to milestones. Currently, the patient's education is grade fourth in elementary school. Before getting sick, patient has normal daily activities like any childrens in his age. None of the families experienced complaints as experienced by the patient.



**Picture 1.** Head CT Scan Without Contras

From the physical examination, the general condition of the patients was adequate and has composmentis consciousness. Blood pressure 110/70mmHg, regular pulse 90x/minutes,

respiratory rate 24x/minutes, temperature 36.8 Celcius. Weigh 22 kg and height 124cm. The general head and neck status showed no abnormalities. Auscultation of the heart show that the patient S1S2 single, grade 4/5 systolic murmur at intercostal (ICS) 5 about 2cm from left midclavicular (MCL) blowing radiating to left arm. Pulmonary examination revealed vesicular sounds, no rhonchi or wheezing. Abdominal examination was normal, there was no hepatomegaly or splenomegaly. Extremity no deformity, edema, or cyanosis.

Neurological examination showed that GCS 456, normal cranial nerves, normal motor strength. Normal physiological reflexes, negative pathological reflexes. Involuntary movement was found in the form of hemichorea. Sensory, autonomic no abnormalities.

On echocardiographic examination, the results showed atrial sinus solitus, AV and VA concordance, normal venous drainage, normal heart chambers, no ASD/PDA/VSD, severe mitral regurgitation with a pressure gradient (PG) of 102 mmHg, no other valve abnormalities were found, normal left ventricular systolic function, normal left aortic arch.

Complete blood count: Hgb 13.6, Leukocytes 3.7, HCT 41.1, Plt 151. Serum electrolytes Na: 135, K: 3.9, Cl: 9.8. An increase in ASTO was found by a value of 442. The results of the head CT scan did not show any abnormalities (Figure 1).

Based on patient history, clinical manifestations, laboratory examination, echocardiography, and imaging, we diagnosed the patient with Sydenham Chorea caused by Rheumatic Carditis. Patients and their families

refuse to do hospitalization and was treated through outpatients with advice not to do much activity, not to be too tired, and to have regular check-ups at the cardiology and neurology departement.

In the management of this patient, for hemichorea, patient is given haloperidol 1 mg and trihexiphenidil 0.5 mg twice a day. Antibiotic erythromycin 250 mg four times a day for 10 days, then the dose is reduced to two times a day for two months. Aspirin is also given at a dose of 300 mg, taken four times a day for 1 month. The patient's complaints of involuntary movements improved slowly, and disappeared within two weeks of starting treatment.

## Discussion

Rheumatic fever (RF) is considered a disease that often affects children (generally between 5-15 years).<sup>9</sup> This disease is rare in children under 5 years of age. Published data estimate that ARF occurs in 1-6.8% of children younger than 5 years.<sup>38</sup> Arthritis and carditis are the most common clinical presentations in this age group. Sydenham's is most common in prepubertal children with a female predominance.<sup>10</sup> The ratio of the incidence of SC in girls to boys is 3:1. In our case it is a 10 year old boy from Indonesia.<sup>2</sup>

Streptococcus are a group of gram-positive bacteria that are morphologically characterized by cocci and chains. Streptococcus pyogenes, which belongs to the GABHS, has the ability to produce toxins that can lyse red blood cells. The cytoplasmic membrane is surrounded by a thick layer of peptidoglycan surrounded by an S layer consisting of carbohydrates, proteins, and glycoproteins. There is also a certain type of carbohydrate, a rhamnose-Nacetyl-glucosamine

dimer with the ability to cross-react with heart valve glycosides.<sup>11</sup>

In sydenham chorea (SC), stimulated antibodies targeted basal ganglia brain cells in the host and its cause a diffuse inflammatory process in the corpus striatum, especially the caudate nucleus. Symptoms of SC are caused by an imbalance between the dopaminergic system, the intrastriatal cholinergic system, and the inhibitory system of gamma-aminobutyric acid (GABA).<sup>12</sup>

SC pathogenesis explains that antibodies produced against GABHS under conditions of acute infection will cross-react with basal ganglia epitopes, disrupting the cortex-basal ganglia-thalamus-cortical (CBGTC) circuit, causing motor, behavioral and cognitive symptoms.<sup>13,14</sup>

Another study found that in SC patients Antibodies also show cross-reactivity to mammalian GM1 lysogangliosides (neural gangliosides) and N-acetyl-β-D-glucosamine (GlcNAc), the carbohydrate dominant epitope of GABHS, and can react with other basal ganglia epitopes, including the tubulin and dopamine receptors D1 and D2 (D1R, D2R).<sup>15</sup>

Studies linking autoantibodies to SC symptoms showed that serum antiD1R and anti-D2R autoantibodies were higher in SC patients compared to controls. More importantly, the anti-D2R/anti-D1R ratio correlated with symptom severity in SC patients, as assessed by The Universidade Federal de Minas Gerais (UFMG) SC Rating Scale.<sup>16</sup>

The usage of dopamine antagonists in the treatment of SC indirectly supports the role that dopaminergic-directed autoantibodies play in the pathophysiology of SC.<sup>17</sup> Decreased serum autoantibody titres are associated with

improvement in symptoms, while patients with persistent SC exhibit still high titers of anti-basal ganglia autoantibodies.<sup>17</sup>

The use of plasmapheresis and intravenous immunoglobulin is considered to be able to affect circulating antibody levels and is therefore considered effective in the treatment of SC. This is consistent with the theory that the motor and neuropsychiatric symptoms of SC patients are the result of autoantibodies acquired by GABHS targeting neurons, leading to alterations in the cortical-basal ganglia-thalamic circuitry of CBGT.<sup>13,14</sup> There have been case reports that have successfully treated SC patients using intravenous immunoglobulin.<sup>1</sup>

Intranasal GABHS infection in mice is also known to increase a strong specific Th17 response in cranial lymphoid tissue, and that these T cells can migrate to the brain. In the brain, GABHS-specific Th17 cells can induce an IL-17-mediated inflammatory response and/or activate microglia and macrophages leading to BBB damage. This process causes autoantibodies to leak into the olfactory bulb and spread to the basal ganglia and other brain areas.<sup>18</sup>

In addition to antibodies, direct action of cytokines and other immune mediators may contribute to neural dysfunction leading to motor, behavioral, and cognitive symptoms in SC. Studies on B1-cell lymphocytes involved in chronic antibody-mediated autoimmune disease, in SC patients with persistent chorea compared with patients with cured or control chorea.<sup>19</sup>

Genetic factors controlling the immune response to GABHS appear to play a relevant role in susceptibility to ARF and its complications, including SC. The major histocompatibility

complex <sup>37</sup> human leukocyte antigen (HLA) polymorphisms, particularly HLA <sup>47</sup> class II, a class of molecules <sup>47</sup> involved in antigen processing and presentation, <sup>47</sup> have been consistently associated with susceptibility to ARF. <sup>20</sup> Furthermore, each copy of the immunoglobulin heavy chain allele IGHV4-61\*02, located in the gene segment IGHV4-61, was found to have an increased risk factor of 1.4 times the risk of rheumatic heart disease. <sup>20</sup>

The Jones criteria are <sup>4</sup> commonly used to diagnose acute RF. The <sup>4</sup> diagnosis of acute rheumatic heart disease (acute or recurrent) can be made if there are <sup>50</sup> two major criteria or one major <sup>10</sup> with two minor. Major criteria are <sup>10</sup> carditis (clinical and/or subclinical), arthritis (polyarthritis only), chorea, erythema marginatum, subcutaneous nodules. Minor criteria are <sup>10</sup> monoarthralgia, fever ( $\geq 38.5^{\circ}\text{C}$ ), increased ESR (60 mm in the first hour) and/or CRP (3 mg/dL or more than normal), <sup>55</sup> prolonged PR interval (except <sup>55</sup> carditis which is a <sup>33</sup> major criteria), evidence of previous GABHS infection (positive throat culture, positive rapid antigen detection test (RADT), and <sup>33</sup> elevated anti-streptococcal antibody titer). <sup>21</sup>

In SC patients, the characteristic 'dance like movement' is usually described as a randomly occurring sequence of one or more involuntary movements affecting other parts of the body. Movement can also occur in only half of the body called hemichorea, which affects a quarter of people with SC. The severity varies significantly, from mild SC, which has mild or no impact on daily life activities, to severe SC, which makes it difficult for patients to carry out daily life activities. In addition to chorea, patients with CS exhibit other motor symptoms, such as motor impairment,

hypometric saccades, hypotonia, and dysarthria. Tic-like movements and vocalizations have been reported, but they usually don't have the typical signal impulses.<sup>12,22</sup> In rare cases, patients may develop hypotonia so severe that the patient is confined to bed, the most severe form of SC known as chorea paralytica. Hyperkinetics and decreased muscle tone are characteristic of acute CS, but patients in CS remission exhibit bradykinesia, suggesting that CS remission patients may develop parkinsonism which may be a marker of CS severity after remission.<sup>12</sup>

Behavioral or psychiatric symptoms are also frequently found in SC patients. <sup>5</sup> Obsessive compulsive disorder (OCD) and attention deficit hyperactivity disorder (ADHD) were more common <sup>5</sup> in SC patients than ARF patients without SC and healthy subjects. In 50 SC patients followed serially with comprehensive psychiatric interviews it was found that the most frequently observed psychiatric disorders included <sup>35</sup> major depression (14%), generalized anxiety disorder (16%), social phobia (24%) and OCD (24%).<sup>23</sup>

As would be expected by immune-mediated CBGTC dysfunction, SC is associated with a range of cognitive deficits that require processing speed and attention. Even patients with SC who had recovered showed impairment in executive function tests, especially verbal fluency, decreased verbal comprehension, which affected their social and occupational functioning. SC patients recover within a few months, and are often considered a benign monophasic condition, with complete remission in more than 80% of patients within six months.<sup>24</sup>

Management goals in SC include: 1) treating and preventing additional GABHS

Infections; 2) control of chorea symptoms; and 3) decisions regarding the need for immune modulation.<sup>12</sup> The most commonly used regimens include a single dose of 1.2 million units of intramuscular (IM) benzathine penicillin G or administration of penicillin VK 500 mg orally for ten days twice daily.<sup>25</sup> The most commonly used for antibiotic prophylaxis regimen is benzathine penicillin G 1.2 million units in children weighing  $\geq 20$  kg and using a dose of 600,000 IU in children weighing  $< 20$  kg given IM every three to four weeks.

Patients with mild SC and not affecting activities of daily life (ADL) do not require symptomatic treatment of SC. When SC affects speech, gait, hand skills, affects self-care, academic and social activities, the use of anti-chorea interventions should be considered.<sup>12</sup>

Administration of dopamine antagonists (antipsychotics) and anticonvulsants in the treatment of SC, leads to more rapid symptom resolution and functional improvement. It is based on an autoimmune-induced basal ganglia dysfunction characterized by excessive dopaminergic activation and decreased activation of the basal ganglia inhibitory pathway.<sup>17</sup> While dopamine antagonists may counteract dopaminergic over-activation, the anticonvulsant effect on this pathophysiological process is less clear, and may involve different mechanisms, such as regulating GABA neurotransmission and calcium flow to basal ganglia neurons preventing neuronal hypersynchronization.<sup>12</sup>

Valproic acid and carbamazepine are the most commonly prescribed anticonvulsants for SC. Valproic acid and carbamazepine have the same effectiveness in clinical improvement, remission

and recurrence rate of SC patients without significant side effects.<sup>26</sup>

Haloperidol is a dopamine antagonist that is often used to treat SC patients. In the study SC patients treated with haloperidol improved more rapidly and had a lower rate of treatment refractoriness, but had more side effects. The administration of haloperidol should be used with caution because SC patients are at high risk for parkinsonism.<sup>8</sup>

Immunomodulatory drugs that are widely used in SC therapy and are effective include corticosteroids, including oral prednisone, oral deflazacort, and intravenous (IV) methylprednisolone. However, there are some side effects of using high doses of corticosteroids including weight gain and acne and in more severe cases progress to Cushing's disease.<sup>4,6</sup>

SC pathophysiology involves autoantibodies that bind to basal ganglia neurons and affect their function, IVIG can inactivate these autoantibodies, whereas plasmapheresis will extract them from plasma. Thus, all SC patients who received IVIG or plasmapheresis showed clinical improvement.<sup>1,5</sup>

Syndhenham chorea is expected to recover completely in one to six months.<sup>26</sup> A retrospective study of 90 patients showed complete remission of motor symptoms in 85% within six months, and an additional 5% had complete remission within one year.<sup>27</sup> One prospective study of 32 patients with CS, followed for more than 2.5 years, found that symptoms persisted for 2 years or more in 50% of their cases.<sup>28</sup>

## Conclusion

Sydenham chorea is a disease caused by group A beta hemolytic streptococcal infection which is characterized by involuntary movements that can be accompanied by behavioral disorders, cognitive impairment, and OCD. Sydenham chorea is a self-limited disease but may show recurrence and/or persistence of motor and neuropsychiatric symptoms in adulthood. Sydenham chorea treatment strategies are antibiotic and prophylactic therapy, symptomatic treatment of sydenham chorea, and immunomodulating interventions. In this case, rheumatic heart disease was also found, which was supported by echocardiography.

## Acknowledgment

The financing is obtained independently

## Conflicts of Interest

There are no conflicts of interest declared by the author.

## References

- Boersma NA, Schippers H, Kuijpers T, Heidema J. Successful treatment of Sydenham's chorea with intravenous immunoglobulin. *BMJ Case Rep*. 2016 Feb;2016.
- Sie J, Sumada IK. The Case Report: Chorea Sydenham In Young Adult Female As Symptom Of Rheumatic Fever. *Callosum Neurol*. 2020;3(1):29–35.
- Cunningham MW. Streptococcus and rheumatic fever. *Curr Opin Rheumatol*. 2012 Jul;24(4):408–16.
- Fusco C, Spagnoli C. Corticosteroid treatment in Sydenham's chorea. *Eur J Paediatr Neurol EJPN Off J Eur Paediatr Neurol Soc*. 2018 Mar;22(2):327–31.
- Gregorowski C, Lochner C, Martin L, Simmons C, Kidd M, Walker K, et al. Neuropsychological manifestations in children with Sydenham's chorea after adjunct intravenous immunoglobulin and standard treatment. *Metab Brain Dis*. 2016 Feb;31(1):205–12.
- Favaretto E, Gortani G, Simonini G, Pastore S, Di Mascio A, Cimaz R, et al. Preliminary data on prednisone effectiveness in children with Sydenham chorea. *Eur J Pediatr*. 2020 Jun;179(6):993–7.
- Direk M, Epcacan S, Epcacan Z, Yildirim DD, Okuyaz C. Efficacy of levetiracetam in the treatment of Sydenham chorea. *Pediatr Int*. 2020 Nov;62(11):1264–8.
- Dean SL, Singer HS. Treatment of Sydenham's Chorea: A Review of the Current Evidence. *Tremor Other Hyperkinet Mov (N Y)*. 2017;7:456.
- OLIVER J, PIERSE N, BAKER MG. Estimating rheumatic fever incidence in New Zealand using multiple data sources. *Epidemiol Infect* [Internet]. 2014/03/06. 2015;143(1):167–77. Available from: <https://www.cambridge.org/core/article/estimating-rheumatic-fever-incidence-in-new-zealand-using-multiple-data-sources/BF171414DC12E3A5032B537A9FA3C364>
- Lardhi AA. Sydenham chorea in a 5-year-old Saudi patient. *Neurosciences (Riyadh)*. 2014 Jul;19(3):236–7.
- Ismail P, Sobur CS, Olyvia C. RECURRENT RHEUMATIC FEVER. *Indones J Int Law* [Internet].

- 2017;14(2):273–5. Available from: <https://www.neliti.com/id/publications/65557/indonesia-and-the-law-of-the-sea>
12. Teixeira AL, Vasconcelos LP, Nunes M do CP, Singer H. Sydenham's chorea: from pathophysiology to therapeutics. *Expert Rev Neurother* [Internet]. 2021;21(8):913–22. Available from: <https://doi.org/10.1080/14737175.2021.1965883>
  13. Cunningham MW, Cox CJ. Autoimmunity against dopamine receptors in neuropsychiatric and movement disorders: a review of Sydenham chorea and beyond. *Acta Physiol (Oxf)*. 2016 Jan;216(1):90–100.
  14. Cunningham MW. Molecular Mimicry, Autoimmunity, and Infection: The Cross-Reactive Antigens of Group A Streptococci and their Sequelae. *Microbiol Spectr*. 2019 Jul;7(4).
  15. Cox CJ, Sharma M, Leckman JF, Zuccolo J, Zuccolo A, Kovoora A, et al. Brain human monoclonal autoantibody from sydenham chorea targets dopaminergic neurons in transgenic mice and signals dopamine D2 receptor: implications in human disease. *J Immunol*. 2013 Dec;191(11):5524–41.
  16. Teixeira Jr. AL, Maia DP, Cardoso F. UFMG Sydenham's chorea rating scale (USCRS): Reliability and consistency. *Mov Disord* [Internet]. 2005 May 1;20(5):585–91. Available from: <https://doi.org/10.1002/mds.20377>
  17. Vasconcelos LPB, Vasconcelos MC, Nunes MDCP, Teixeira AL. Sydenham's chorea: an update on pathophysiology, clinical features and management. *Expert Opin Orphan Drugs* [Internet]. 2019 Nov 2;7(11):501–11. Available from: <https://doi.org/10.1080/21678707.2019.1684259>
  18. Dileepan T, Smith ED, Knowland D, Hsu M, Platt M, Bittner-Eddy P, et al. Group A Streptococcus intranasal infection promotes CNS infiltration by streptococcal-specific Th17 cells. *J Clin Invest*. 2016 Jan;126(1):303–17.
  19. McAfoose J, Baune BT. Evidence for a cytokine model of cognitive function. *Neurosci Biobehav Rev*. 2009 Mar;33(3):355–66.
  20. Gray LA, D'Antoine HA, Tong SYC, McKinnon M, Bessarab D, Brown N, et al. Genome-Wide Analysis of Genetic Risk Factors for Rheumatic Heart Disease in Aboriginal Australians Provides Support for Pathogenic Molecular Mimicry. *J Infect Dis*. 2017 Dec;216(11):1460–70.
  21. Gewitz MH, Baltimore RS, Tani LY, Sable CA, Shulman ST, Carapetis J, et al. Revision of the Jones Criteria for the Diagnosis of Acute Rheumatic Fever in the Era of Doppler Echocardiography. *Circulation* [Internet]. 2015 May 19;131(20):1806–18. Available from: <https://doi.org/10.1161/CIR.0000000000000205>
  22. de Teixeira AL, Cardoso F, Maia DP, Sacramento DR, Mota C de CC, Meira ZMA, et al. Frequency and significance of vocalizations in Sydenham's chorea. *Parkinsonism Relat Disord*. 2009 Jan;15(1):62–3.

23. Punukollu M, Mushet N, Linney M, Hennessy C, Morton M. **Neuropsychiatric manifestations of Sydenham's chorea: a systematic review.** *Dev Med Child Neurol.* 2016 Jan;58(1):16–28.
24. Harsányi E, Moreira J, Kummer A, Meira ZMA, Cardoso F, Teixeira AL. **Language Impairment in Adolescents With Sydenham Chorea.** *Pediatr Neurol.* 2015 Nov;53(5):412–6.
25. Carapetis JR, Beaton A, Cunningham MW, Guilherme L, Karthikeyan G, Mayosi BM, et al. **Acute rheumatic fever and rheumatic heart disease.** *Nat Rev Dis Prim.* 2016 Jan;2:15084.
26. Genel F, Arslanoglu S, Uran N, Saylan B. **Sydenham's chorea: clinical findings and comparison of the efficacies of sodium valproate and carbamazepine regimens.** *Brain Dev.* 2002 Mar;24(2):73–6.
27. 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 Dev.* 2016 Oct;38(9):827–34.
28. Cardoso F, Vargas AP, Oliveira LD, Guerra AA, Amaral S V. **Persistent Sydenham's chorea.** *Mov Disord.* 1999 Sep;14(5):805–7.

# Sydenham Chorea On Indonesian 10 Years Old Boy Caused By Rheumatic Heart Disease : Case Report And Literature Review

## ORIGINALITY REPORT

**25%**  
SIMILARITY INDEX

%  
INTERNET SOURCES

**22%**  
PUBLICATIONS

**15%**  
STUDENT PAPERS

## PRIMARY SOURCES

- 1** Rogério Beato, Débora P. Maia, Antônio Lúcio Teixeira, Francisco Cardoso. "Executive functioning in adult patients with Sydenham's chorea", *Movement Disorders*, 2010  
Publication 1%
- 2** Submitted to UNILIBRE  
Student Paper 1%
- 3** "Diretrizes", *Arquivos Brasileiros de Cardiologia*, 2009  
Publication 1%
- 4** Deewakar Sharma, Dipanker Prajapati, Urmila Shakya, Manish Shrestha et al. "Consensus Statement of Cardiac Society of Nepal on Diagnosis, Management and Prevention of Acute Rheumatic Fever and Rheumatic Heart Disease in Nepal", *Nepalese Heart Journal*, 2022  
Publication 1%
- 5** Francisco Cardoso. "Chapter 26 Chorea, Ballism, and Athetosis", *Springer Science and* 1%

## Business Media LLC, 2017

Publication

---

6

Madeleine W. Cunningham. "Rheumatic Fever, Autoimmunity, and Molecular Mimicry: The Streptococcal Connection", International Reviews of Immunology, 2014

Publication

---

1 %

7

Submitted to Victoria University of Wellington

Student Paper

---

1 %

8

Carmelo Tiberio Currò, Giulia Nicocia, Vanessa Ziccone, Antonio Ciacciarelli et al. "Pimozide and pancreatic cancer in diabetic chorea: a case report", International Journal of Neuroscience, 2021

Publication

---

1 %

9

Achille Marino, Rolando Cimaz, Maria Antonietta Pelagatti, Giulia Tattesi et al. "Acute Rheumatic Fever: Where Do We Stand? An Epidemiological Study in Northern Italy", Frontiers in Medicine, 2021

Publication

---

1 %

10

Amy Scheel, Andrea Z Beaton, Judith Katzenellenbogen, Tom Parks et al. "Standardization of Epidemiological Surveillance of Acute Rheumatic Fever", Open Forum Infectious Diseases, 2022

Publication

---

1 %

11	Submitted to Nottingham Trent University Student Paper	1 %
12	"Abstracts", Movement Disorders, 2019 Publication	1 %
13	Submitted to University of Sydney Student Paper	1 %
14	Submitted to Manchester Metropolitan University Student Paper	1 %
15	Tetsuya Asakawa, Kenji Sugiyama, Takao Nozaki, Tetsuro Sameshima et al. "Current behavioral assessments of movement disorders in children", CNS Neuroscience & Therapeutics, 2018 Publication	1 %
16	Submitted to 87986 Student Paper	1 %
17	Submitted to Hacettepe University Student Paper	1 %
18	Submitted to Sydney Child Health Program Student Paper	<1 %
19	Submitted to University of Edinburgh Student Paper	<1 %
20	"Neurologic indications for therapeutic plasma exchange: 2013 update : Neurologic	<1 %

# Indications for Therapeutic Plasma Exchange", Journal of Clinical Apheresis, 2014.

Publication

---

21

Ben-Pazi, Hilla, Julie A. Stoner, and Madeleine W. Cunningham. "Dopamine Receptor Autoantibodies Correlate with Symptoms in Sydenham's Chorea", PLoS ONE, 2013.

Publication

---

22

Submitted to Brookline College Phoenix

Student Paper

---

23

Patrícia M Oliveira, Francisco Cardoso, Débora P Maia, Mauro César Q Cunningham, Antonio Lúcio Teixeira Jr, César Reis. "Acoustic analysis of prosody in Sydenham's chorea", Arquivos de Neuro-Psiquiatria, 2010

Publication

---

24

Cleonice C. Coelho Mota, Vera Demarchi Aiello, Robert H. Anderson. "Rheumatic Fever", Elsevier BV, 2010

Publication

---

25

Submitted to Fiji National University

Student Paper

---

26

K. N. Shakya, A. Bhatta, A. Yadav, U. Gautam, S. Basnet. "Sydenham's Chorea with Silent Cardiac Lesions, Mimicking Encephalitis in a 13 Year Old Girl", Kathmandu University Medical Journal, 2021

Publication

<1 %

<1 %

<1 %

<1 %

<1 %

<1 %

---

27 Rahmini Shabariah, Farsida, Mochammad Hatta, Ilhamjaya Patellongi et al. "Correlation between innate and adaptive immunity response in TB children post BCG vaccination. Is it effective or not?: Cross-sectional study", Annals of Medicine and Surgery, 2022  
Publication <1 %

---

28 Submitted to Temple University  
Student Paper <1 %

---

29 "Family Medicine", Springer Science and Business Media LLC, 2017  
Publication <1 %

---

30 Submitted to Holmesglen Institute of TAFE  
Student Paper <1 %

---

31 "Infections and the Rheumatic Diseases", Springer Science and Business Media LLC, 2019  
Publication <1 %

---

32 K. DAVIS, S. PHILPOTT, D. KUMAR, M. MENDALL. "Randomised double-blind placebo-controlled trial of aloe vera for irritable bowel syndrome", International Journal of Clinical Practice, 2006  
Publication <1 %

---

33 Submitted to AUT University  
Student Paper <1 %

---

34

Submitted to Aston University

Student Paper

&lt;1 %

35

Janaina Moreira, Arthur Kummer, Estefânia Harsányi, Francisco Cardoso, Antonio L. Teixeira. "Psychiatric disorders in persistent and remitted Sydenham's chorea", *Parkinsonism & Related Disorders*, 2014

Publication

&lt;1 %

36

Mary Chesshyre, Deborah Ridout, Yasumasa Hashimoto, Yoko Ookubo et al. "Duchenne muscular dystrophy patients lacking the dystrophin isoforms Dp140 and Dp71 and mouse models lacking Dp140 have a more severe motor phenotype", *Cold Spring Harbor Laboratory*, 2021

Publication

&lt;1 %

37

*Pediatric and Congenital Cardiology Cardiac Surgery and Intensive Care*, 2014.

Publication

&lt;1 %

38

Alina Sehar, Saad Nasir, Arshi Seja. "Rheumatic Chorea as the First Presenting Sign in a 13-year-old Female Child", *Cureus*, 2019

Publication

&lt;1 %

39

Guzman-Cottrill, J.A.. "Acute rheumatic fever: Clinical aspects and insights into pathogenesis

&lt;1 %

and prevention", Clinical and Applied  
Immunology Reviews, 200405

Publication

---

40

"Chorea", Springer Science and Business  
Media LLC, 2014

Publication

---

41

"Hyperkinetic Movement Disorders", Springer  
Science and Business Media LLC, 2012

Publication

---

42

"Hyperkinetic Movement Disorders", Wiley,  
2011

Publication

---

43

Fuat Laloğlu, Naci Ceviz. "Changes in the  
frequency and clinical features of acute  
rheumatic fever in the COVID-19 era: a  
retrospective analysis from a single center",  
Revista da Associação Médica Brasileira, 2022

Publication

---

44

R. Rizzo. "Increased Antistreptococcal  
Antibody Titers and Anti--Basal Ganglia  
Antibodies in Patients With Tourette  
Syndrome: Controlled Cross-Sectional Study",  
Journal of Child Neurology, 09/01/2006

Publication

---

45

Robert L. Myette. "Acute Rheumatic Fever: A  
Disease of the Past?", Case Reports in  
Infectious Diseases, 2020

Publication

---

<1 %

<1 %

<1 %

<1 %

<1 %

<1 %

46

Ure Eke, John Berth-Jones. "Mycobacterial (atypical) skin infections", Elsevier BV, 2018

Publication

<1 %

47

Bethel Woldu, Gerald S. Bloomfield. "Rheumatic Heart Disease in the Twenty-First Century", Current Cardiology Reports, 2016

Publication

<1 %

48

Harsányi, Estefânia, Janaina Moreira, Arthur Kummer, Zilda Maria Alves Meira, Francisco Cardoso, and Antonio L. Teixeira. "Language Impairment in Adolescents With Sydenham Chorea", Pediatric Neurology, 2015.

Publication

<1 %

49

Jubran Alqanatish, Abdulmajeed Alfadhel, Areej Albelali, Dhafer Alqahtani. "Acute rheumatic fever diagnosis and management: Review of the global implications of the new revised diagnostic criteria with a focus on Saudi Arabia", Journal of the Saudi Heart Association, 2019

Publication

<1 %

50

Moore, . "Immune-related disorders", Textbook of Clinical Neuropsychiatry and Behavioral Neuroscience 3E, 2012.

Publication

<1 %

51

Taryn Miller, Yee Aung, David Blundell, Amal Saleh Eldin Seed Ahmed Kona. "Unusual

<1 %

presentation of rheumatic fever in a 3-year-old child in the UK", BMJ Case Reports, 2020

Publication

---

52

Valerija Dobricic, Marcel Schilling, Ildiko Farkas, Djordje O Gveric et al. "Common signatures of differential microRNA expression in Parkinson's and Alzheimer's disease brains", Cold Spring Harbor Laboratory, 2022

Publication

---

<1 %

53

de Teixeira, A.L.. "Frequency and significance of vocalizations in Sydenham's chorea", Parkinsonism and Related Disorders, 200901

Publication

---

<1 %

54

Hortensia Gimeno, Sinead Barry, Jean-Pierre Lin, Anne Gordon. "Functional Impact of Sydenham's Chorea: A Case Report", Tremor and Other Hyperkinetic Movements, 2013

Publication

---

<1 %

55

Nigar Aliyeva, Yilmaz Yozgat, Nijad Bakhshaliyev, Telli Zadehgan Afshord, Can Yilmaz Yozgat, Ali Guven Kilicoglu. "Evaluation of Executive Functions in Children with Rheumatic Heart Diseases", Pediatrics International, 2021

Publication

---

<1 %

---

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off