**Hemophilic Pseudotumor of the Knee Joint: an uncommon complication of a rare disease**

**ABSTRACT:**

Hemophilic pseudotumors are rare complications occurring in individuals with severe hemophilia, characterized by progressive cystic swellings in muscles and/or bones due to recurrent bleeding. Although their incidence has decreased with the advent of factor VIII replacement therapy, they still create challenges, particularly in regions with limited access to medical care. Here, we present a case report of a hemophilic pseudotumor of the knee joint in a 15 year old male with hemophilia A. The patient presented with severe left knee pain, swelling, and restricted range of motion, prompting further investigation. Imaging studies revealed lytic lesions and effusion consistent with hemophilic arthropathy. Prompt initiation of factor VIII replacement therapy and supportive management led to significant improvement in symptoms and joint functionality. This case highlights the importance of early recognition and management of hemophilic pseudotumors to prevent complications and optimize patient outcomes.

**INTRODUCTION:**

Hemophilia A and B, both X-linked clotting disorders, result from a deficiency in factors VIII and IX, respectively. The clinical presentation varies based on disease severity. Severe hemophilia is characterized by spontaneous bleeding into joints and muscles, which occurs usually when the level of Factor VIII is below 1% of its normal value. [1][2]. Over time, repeated joint bleeds lead to painful and debilitating hemophilic arthropathy. The elbows, knees, and ankles are the most commonly affected joints [3]. Pseudotumors are rare complications in hemophiliacs, involving chronic encapsulated blood collections due to recurrent bleeding in bones or soft tissues. As these swell, pressure within the hematoma damages nearby structures[4]. Hemophilic pseudotumors have significantly decreased in both frequency and severity due to the utilization of factor VIII replacement therapy[5][6]. Nevertheless, this complication can persist in developing nations, where access to medical services remains limited. We report a case of hemophilic pseudotumor of the knee joint in a 15 year old male.

**KEYWORDS:** *Hemophilic Pseudotumor, Hemophilia, Knee Joint*

***KEY CLINICAL MESSAGE:*** *Hemophilic pseudotumors are rare complications occurring in individuals with severe hemophilia, characterized by progressive cystic swellings in muscles and/or bones due to recurrent bleeding. Timely initiation of factor VIII replacement is crucial.*

**CASE REPORT:**

### ***Case history and examination:*** A 15 year old male with a known history of hemophilia A, presented to the orthopedic clinic complaining of severe left knee pain, swelling, and restricted range of motion over the past three weeks. Patient has reported that the pain and swelling began a week ago following a fall from a bicycle, and his symptoms were progressively worsening, particularly exacerbated with weight-bearing activities. Clinical examination revealed diffuse swelling, warmth, and tenderness around the left knee joint, with limited range of motion noted, especially in flexion and extension. Clinical picture of the left knee joint is highlighted in Figure 1. Neurovascular examination was carried out to rule out any grave complication, due to the significant swelling, but was normal. Blood tests showed a normal complete blood count but revealed an elevated activated partial thromboplastin time (aPTT), consistent with his underlying hemophilia A.

***Methods:*** Plain radiograph of the left knee knee joint was done and it showed a lytic area in intercondylar eminence and along lateral tibial plateau and distension in suprapatellar region with fat pad separation suggesting suprapatellar bursal fluid. (Figure 2). For further characterization and plan of management, non-contrast CT and MRI were advised given the nature of the history and physical examination leading to the diagnosis of hemophilic arthropathy. Non-contrast CT scan revealed lytic lesions in tibial plateau and widened intercondylar notch. (Figure 3). Suprapatellar T1/PD hyperintense

effusion (block white arrows) in patellofemoral compartment extending to suprapatellar recess

suggesting hemorrhagic effusion was noted in the MRI. (Figure 4 and 5). Diagnosis of Hemophilic Pseudotumor was made.

### ***Conclusion and results:*** Treatment was promptly initiated, including factor VIII replacement therapy to control bleeding and inflammation, along with pain management using analgesics and NSAIDs. Knee immobilization was suggested for the first week of the treatment to facilitate decrease in the swelling and physical therapy was commenced to improve joint function and strength. Regular follow-up appointments were scheduled to monitor the pseudotumor size and assess treatment response. Over the following weeks, our patient responded well to the treatment regimen, with a gradual decrease in pain and swelling noted. Follow-up after 2 months showed that the swelling had significantly reduced in size, with marked improvement in the functionality of the knee joint. His lab values, along with PT, aPTT, and factor VIII assay were also within normal limits.

**DISCUSSION:**

Hemophilic pseudotumors are rare complications occurring in less than 2% of patients with severe hemophilia, characterized by progressive cystic swellings in muscle and/or bone due to repeated bleeding [7] . In 1918, Starker provided the initial description of pseudotumors [8]. Multiple studies have investigated hemophilic pseudotumors, examining their diverse origins, clinical presentations, and management modalities [9]. However, the evidence of hemophilic pseudotumor occuring in the knee joint are relatively rare in the literature.

Hemophilic pseudotumors manifest initially as painless, solid masses that adhere to deeper tissues. Though initially asymptomatic, they can later lead to pathological fractures. Typically, these pseudotumors appear as slowly expanding, enclosed cystic masses, and some patients recall a prior injury before their emergence. These masses often restrict mobility due to their size and location. Furthermore, the skin overlaying them may undergo necrosis, leading to infection, or the masses may rupture, resulting in swift bleeding.[10][11][12].It can result in joint deformities, necrosis of soft tissues, and compartment syndromes. Volkmann’s contractures frequently arise in individuals with hemophilia due to extensive hemorrhage within forearm muscles. Moreover, ankle contractures might develop, requiring prompt intervention. Furthermore, these pseudotumors can lead to bone deterioration, formation of fistulas, and damage to peripheral nerves. [9][13][14].

Hemophilic pseudotumors are diagnosed and characterized through a combination of methods, including physical examination, X-rays, sonography, CT scans, MRI, and blood tests. Among these, MRI is deemed highly effective for detecting and diagnosing HP, aiding in treatment decisions, and evaluating treatment outcomes. It allows monitoring of blood product evolution, lesion size in hard-to-reach areas, and recurrent bleeding in chronic lesions. A special type of MRI sequence, called gradient echo T2-weighted, is commonly used for hemophilic joint evaluation. It can detect hemosiderin and cartilage changes. Using a contrast agent like gadolinium isn't consistently helpful for hemophilic arthropathy. Different MRI scales, like Denver and European, were developed to track joint damage and compare treatments. These scales rate joint changes, such as fluid and cartilage loss, to monitor progression. Both scales show good agreement among different readers and for repeated readings. [7] [12] [13][15].

Several treatment protocols are available, each presenting their own advantages and drawbacks. Combining replacement therapy with immobilization proves beneficial for small, recently developed pseudotumors. Ultrasound-guided aspiration is appropriate for pseudotumors containing fluid content. While curettage can decrease the pseudotumor mass, it carries risks such as persistent fistula, recurrence, or infection. Radiotherapy targets unresectable lesions by impacting blood vessels and endothelial proliferation. Intra-arterial embolization helps in reducing bleeding during surgery. Surgical intervention, particularly for proximal pseudotumors, stands as the most effective approach. Nevertheless, due to the distinctive nature of this condition and the limited number of clinical cases, managing complex hemophilic pseudotumors remains a challenge.

[9][10][16].

**CONCLUSION:**

While hemophilic pseudotumors have become less prevalent in regions where factor VIII replacement therapy is readily accessible, they persist as a significant challenge in areas with limited healthcare resources. Timely initiation of factor VIII replacement therapy is crucial not only for controlling bleeding and inflammation but also for preventing complications such as joint deformities and soft tissue necrosis. This should be done along with adequate anti-inflammatory medications, physiotherapy and possibly surgical management. Ensuring equitable access to factor VIII replacement therapy in developing nations can substantially improve the quality of life and long-term outcomes for individuals with hemophilia, highlighting the urgent need for global efforts to address healthcare disparities and ensure access to essential treatments for all individuals, regardless of geographical location or socioeconomic status.

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## **CONFLICT OF INTEREST STATEMENT:**

## The authors declare no conflict of interest in this study.

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## **ETHICS STATEMENT:**

The patient has provided written informed consent for the publication of this case report.

## **CONSENT:**

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

**AUTHOR CONTRIBUTION STATEMENT:**

**Shritik Devkota**: Conceptualization, Data curation, Writing – original draft, Writing – review & editing

**Sugat Adhikari**: Conceptualization, Data curation, Writing – original draft, Writing – review & editing

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**Shayeri Choudhary** : Conceptualization, Data curation, Writing – original draft

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# **REFERENCES:**

[1] A. Pakala, J. Thomas, and P. Comp, “Hemophilic Pseudotumor: A Case Report and Review of Literature,” *Int J Clin Med*, vol. 03, no. 03, pp. 229–233, 2012, doi: 10.4236/IJCM.2012.33046.

[2] H. U, G. D, L. JM, and H. KA, “Congenital Hemorrhagic Disorders: New Insights into the Pathophysiology and Treatment of Hemophilia,” *Hematology Am Soc Hematol Educ Program*, vol. 2000, no. 1, pp. 241–265, Jan. 2000, doi: 10.1182/ASHEDUCATION-2000.1.241.

[3] M. J. Manco-Johnson, J. M. Soucie, and J. C. Gill, “Prophylaxis usage, bleeding rates, and joint outcomes of hemophilia, 1999 to 2010: a surveillance project,” *Blood*, vol. 129, no. 17, pp. 2368–2374, Apr. 2017, doi: 10.1182/BLOOD-2016-02-683169.

[4] M. Magallón *et al.*, “Hemophilic pseudotumor: Multicenter experience over 25-year period,” *Am J Hematol*, vol. 45, no. 2, pp. 103–108, Feb. 1994, doi: 10.1002/AJH.2830450202.

[5] A. Y. Kwon *et al.*, “Haemophilic pseudotumour in two parts of the maxilla: case report,” *Dentomaxillofac Radiol*, vol. 45, no. 6, 2016, doi: 10.1259/DMFR.20150440.

[6] E. C. Rodriguez-Merchan, “Haemophilic cysts (pseudotumours),” *Haemophilia*, vol. 8, no. 3, pp. 393–401, May 2002, doi: 10.1046/J.1365-2516.2002.00609.X.

[7] J. S. Park and K. N. Ryu, “Hemophilic pseudotumor involving the musculoskeletal system: Spectrum of radiologic findings,” *American Journal of Roentgenology*, vol. 183, no. 1, pp. 55–61, Nov. 2004, doi: 10.2214/AJR.183.1.1830055/ASSET/IMAGES/07\_03\_0207\_13B.JPEG.

[8] G. Nachimuthu, J. Arockiaraj, V. Krishnan, and G. D. Sundararaj, “Hemophilic pseudotumor of the first lumbar vertebra,” *Indian J Orthop*, vol. 48, no. 6, p. 617, Nov. 2014, doi: 10.4103/0019-5413.144238.

[9] E. Carlos Rodriguez-Merchan, “Hemophilic Pseudotumors: Diagnosis and Management,” *Archives of Bone and Joint Surgery*, vol. 8, no. 2, p. 121, Mar. 2020, doi: 10.22038/ABJS.2019.40547.2090.

[10] E. C. Rodriguez-Merchan, “The haemophilic pseudotumour,” *Haemophilia*, vol. 8, no. 1, pp. 12–16, 2002, doi: 10.1046/J.1365-2516.2002.00577.X.

[11] Feng Xue, Chaoxia Sun, Tao Sui, Lei Zhang, Lihui Jiang, and Renchi Yang, “Hemophilic Pseudotumor in Chinese Patients: A Retrospective Single-Centered Analysis of 14 Cases,” *http://dx.doi.org/10.1177/1076029610366433*, vol. 17, no. 3, pp. 279–282, May 2010, doi: 10.1177/1076029610366433.

[12] D. A. Wilson and J. R. Prince, “MR imaging of hemophilic pseudotumors,” *American Journal of Roentgenology*, vol. 150, no. 2, pp. 349–350, 1987, doi: 10.2214/AJR.150.2.349.

[13] S. Jaovisidha, K. N. Ryu, J. Hodler, M. E. Schweitzer, D. J. Sartoris, and D. Resnick, “Hemophilic pseudotumor: Spectrum of MR findings,” *Skeletal Radiol*, vol. 26, no. 8, pp. 468–474, Aug. 1997, doi: 10.1007/S002560050268/METRICS.

[14] A. K. Ahlberg, “On the natural history of hemophilic pseudotumor.,” *J Bone Joint Surg Am*, vol. 57, no. 8, pp. 1133–6, Dec. 1975.

[15] G. Hermann, M. S. Gilbert, I. F. Abdelwahab, G. Hermann, M. S. Gilbert, and I. F. Abdelwahab, “Hemophilia: evaluation of musculoskeletal involvement with CT, sonography, and MR imaging.,” *https://doi.org/10.2214/ajr.158.1.1727336*, vol. 158, no. 1, pp. 119–123, Jan. 2013, doi: 10.2214/AJR.158.1.1727336.

[16] Y. feng Yao, Q. Gao, J. le Li, C. xi Xue, W. Fang, and J. hua Jing, “Outcome of Surgical Management of Hemophilic Pseudotumor: Review of 10 Cases from Single-Center,” *Orthop Surg*, vol. 14, no. 1, pp. 27–34, Jan. 2022, doi: 10.1111/OS.13174.