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CASE REPORT

RARE CASE OF SPONTANEOUS SPLENIC RUPTURE IN A PATIENT WITH UNDIAGNOSED EHLERS-DANLOS SYNDROME: A SURGICAL APPROACH

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Abstract

Introduction: Spontaneous rupture of the spleen (SSR) is a rare but potentially fatal emergency, typically linked to trauma, infections, or hematological conditions. Its occurrence as an initial manifestation of the vascular form of Ehlers-Danlos syndrome (vEDS) is particularly uncommon and presents significant diagnostic and therapeutic challenges. Given the life-threatening nature of SSR and the complexities introduced by vEDS, early recognition is crucial.

Methods: We report the case of a 34-year-old previously healthy female who presented with acute severe pain in the left upper quadrant and left shoulder tip, accompanied by profound hypotension and clinical features of hypovolaemic shock. Diagnostic imaging via computed tomography revealed a large subcapsular splenic hematoma with signs of active extraperitoneal bleeding. An emergency splenectomy was performed.

Results: Postoperatively, the patient exhibited delayed wound healing, hyperextensible skin, and generalized joint laxity—clinical signs that raised suspicion of a connective tissue disorder. Subsequent genetic testing confirmed the presence of a pathogenic mutation in the COL3A1 gene, establishing the diagnosis of vascular Ehlers-Danlos syndrome (vEDS).

Conclusion: This case underscores the importance of considering rare connective tissue disorders like vEDS in the differential diagnosis of atraumatic SSR. Early diagnosis can influence emergency surgical decision-making and ensures timely genetic counseling, ongoing multidisciplinary management, and proactive family risk assessment.

Keywords: atraumatic intra-abdominal haemorrhage, connective-tissue disorder, COL3A1 mutation, spontaneous splenic rupture, vascular Ehlers–Danlos syndrome

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BACKGROUND/INTRODUCTION

Spontaneous splenic rupture (SSR) is a rare, however life-threatening, surgical emergency described as atraumatic disruption of the splenic parenchyma leading to intraperitoneal hemorrhage. Most SSR cases are secondary to underlying pathologies, which include infectious mononucleosis, malaria, hematological malignancies (e.g., leukemia, lymphoma), or inflammatory issues [1]. In the absence of trauma or identifiable local sickness, SSR poses a enormous diagnostic challenge and frequently delays definitive treatment.

Ehlers-Danlos syndrome (EDS) represents a group of rare inherited connective tissue disorders characterised by hyperextensible skin, joint hypermobility, and tissue fragility [2]. Among its subtypes, the vascular type (EDS type IV) is particularly associated with vascular and organ rupture, in most cases affecting large arteries and hollow organs [3]. However, spontaneous rupture of the spleen in EDS patients is exceedingly rare, with only a few cases reported in the literature [4].

The diagnosis of EDS is often overlooked or delayed due to its heterogeneous presentation and lack of clinical suspicion, especially in patients who have not previously demonstrated classical connective tissue features [5]. Early recognition is crucial, as vascular-type EDS carries a high risk of sudden catastrophic events and requires specific perioperative and long-term management strategies [6]. Herein, we present a rare case of SSR in a young woman with previously undiagnosed EDS, emphasizing the diagnostic pitfalls and the importance of a thorough systemic assessment in patients presenting with atraumatic intra-abdominal hemorrhage.

RESULTS

A formerly wholesome 34-year-vintage woman arrived on the emergency branch with a sudden, stabbing pain in her left upper quadrant that started out while she turned into lifting a heavy box of groceries. The ache fast intensified, radiating to her left shoulder and generating dizziness and a near-syncopal episode. She described it as “the worst pain of my existence,” noting no alleviation with rest or the oral analgesics she had taken at domestic. She denied latest trauma, falls, or other blunt abdominal injuries. Her clinical history became negative for liver sickness, coagulation problems, or other hematologic conditions, and he or she reported no current viral illness, fever, or sore throat. Gynecologic history was unremarkable, without a latest pregnancies or recognised gynecologic problems. She had by no means taken anticoagulant or antiplatelet medications.

circle of relatives history discovered unexpected cardiac deaths in maternal uncles of their 40s and easy bruising in her mom, despite the fact that no formal diagnoses have been reported. Social history become negative for tobacco, alcohol, or illicit drug use. She worked as a yoga teacher and defined herself as "very bendy," despite the fact that she had never been evaluated for connective tissue ailment.

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On examination, the patient appeared pale, anxious, and diaphoretic.

- **Vital signs**: BP 82/54 mmHg; HR 124 bpm; RR 24; SpO_2 96% on room air; T 36.8°C.
- **General**: She was conscious but in significant distress due to pain.
- **Skin**: Multiple scattered ecchymoses on her upper and lower extremities, hyperextensible skin with atrophic scars over both knees.
- **Musculoskeletal**: Beighton score was 6/9, demonstrating generalized joint hypermobility (passive dorsiflexion of fifth fingers beyond 90°, thumb apposition to forearm, hyperextension of elbows and knees beyond 10°).
- **Abdominal**: Distended and tender in the left upper quadrant with guarding and rebound tenderness; positive Kehr's sign indicating diaphragmatic irritation.
- **Cardiopulmonary**: Tachycardia with regular rhythm, no murmurs; lungs clear.

The initial laboratory investigations are as follows:

- **Hemoglobin**: 7.8 g/dL (baseline unknown; severe anemia suggesting acute hemorrhage)
- **Hematocrit**: 24%
- **White blood cells**: 10.2 $\times 10^9$/L
- **Platelets**: 230 $\times 10^9$/L
- **INR**: 1.1 (normal coagulation)
- **aPTT**: 32 seconds (normal)
- **Fibrinogen**: 310 mg/dL
- **Serum lactate**: 5.2 mmol/L (elevated, indicating tissue hypoperfusion)
- **Creatinine**: 1.0 mg/dL
- **ALT/AST**: Normal
- **Bilirubin**: Normal

Type and crossmatch were performed immediately in anticipation of massive transfusion.

A contrast-enhanced abdominal CT scan confirmed active contrast extravasation from a large subcapsular hematoma at the inferior pole of the spleen, indicating ongoing arterial bleeding. There were no splenic masses, ulcers, or surrounding injuries to suggest trauma or neoplastic infiltration. No other intra-abdominal injuries were identified.

Due to the patient's hemodynamic instability, no preoperative endoscopic evaluation was performed. During surgery, the resected spleen was sent for histopathological analysis. Microscopic examination revealed extensive subcapsular and intraparenchymal hemorrhage without evidence of malignancy, infarction, or infectious infiltration. No vascular malformations or parasitic cysts were identified.

The spleen was found to have a grade 6 laceration with active bleeding extending from the hilum to the inferior pole. She required an additional two units of packed red blood cells and one unit of platelets. By postoperative day 3, her midline laparotomy incision showed delayed healing with partial superficial wound dehiscence, raising further suspicion of an underlying connective tissue disorder.

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Examination of her skin and joints revealed hyperextensibility and joint hypermobility, leading to a high index of suspicion for Ehlers-Danlos syndrome. Genetic counseling and evaluation were initiated. Targeted next-generation sequencing confirmed a pathogenic heterozygous mutation in the COL3A1 gene, consistent with vascular-type Ehlers-Danlos syndrome (vEDS, EDS type IV). She received extensive education regarding the lifelong risks of vascular complications and was referred to a multidisciplinary connective tissue disease clinic. The patient was vaccinated against encapsulated organisms (pneumococcus, Haemophilus influenzae type B, and meningococcus) to reduce the risk of post-splenectomy infections. At her six-month follow-up, the patient reported a gradual return to baseline activities, including modified gentle yoga. She had experienced no new vascular or organ complications and remained under regular monitoring by both a vascular surgeon and a clinical geneticist

DISCUSSION

Spontaneous splenic rupture (SSR) is a rare but life-threatening event that often demands immediate recognition and surgical management. SSR is typically linked to infections (e.g., mononucleosis, malaria), hematologic malignancies, and infiltrative disorders; however, spontaneous rupture in a structurally normal spleen poses a unique diagnostic dilemma [7].

Vascular-type Ehlers-Danlos syndrome (vEDS), caused by pathogenic variants in the COL3A1 gene, leads to defective type III collagen and marked fragility of blood vessels and hollow viscera [8]. While vascular and gastrointestinal ruptures are documented complications of vEDS, splenic involvement is exceedingly rare, with only two adult cases in literature review and one pediatric case managed by splenic artery embolization [9,10]. Our case adds to this limited body of evidence. The absence of trauma and infectious symptoms, along with stable coagulation parameters, distinguished this instance from more common causes. The presence of hyperextensible skin, joint hypermobility, and delayed wound healing directed our suspicion toward vEDS, which was subsequently confirmed via genetic testing [8,11].

Early diagnosis is critical: although emergent splenectomy remains standard for hemodynamically unstable patients, knowing a diagnosis of vEDS in advance could guide consideration of less invasive options such as splenic artery embolization and prompt gentler surgical techniques to reduce tissue trauma and bleeding [10,12]. Multidisciplinary management involving surgeons, geneticists, and radiologists is essential in such cases [7].

Postoperative care also requires special consideration: because vEDS patients have profound vascular fragility, procedural interventions like percutaneous biopsies or central line placements can carry elevated risk. Long-term follow-up must include regular noninvasive imaging surveillance and prophylactic measures, for

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example, vaccination and prompt antibiotic therapy for capsulated-organ risk post-splenectomy [7,10]. Finally, comprehensive genetic testing is vital for confirming vEDS and facilitating family counseling. Recent literature emphasizes the role of early detection through next-generation sequencing in improving patient prognoses and enabling cascade testing of at-risk family members [11].

CONCLUSION

Spontaneous splenic rupture (SSR) should be considered in cases of acute abdomen with hemodynamic instability, even without trauma, as it may signal rare conditions like vascular Ehlers-Danlos syndrome (vEDS). In this case, rapid progression to hypovolemic shock and intraoperative findings confirmed SSR, with subtle signs like skin hyperextensibility and joint laxity pointing to vEDS. Early recognition is crucial, influencing acute surgical decisions and long-term care. While open splenectomy was necessary here, prior diagnosis might have permitted less invasive options. Comprehensive follow-up, including vascular imaging, infection prevention, and genetic counseling, is vital to improving outcomes in such high-risk patients.

LIMITATION

This report is based on a single case and may not represent the full spectrum of vEDS presentations,limiting the broader applicability of the findings.

RECOMMENDATION

Clinicians should maintain a high index of suspicion for connective tissue disorders in unexplained atraumatic hemorrhages to enable timely diagnosis and intervention.

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CONFLICT OF INTEREST

The author declares no conflict of interest related to this study.

LIST OF ABBREVIATIONS

SSR - Spontaneous Splenic Rupture

vEDS - Vascular Ehlers-Danlos Syndrome

CT - Computed Tomography

COL3A1 - Type III Collagen Alpha 1 Chain gene

BP - Blood Pressure

HR - Heart Rate

aPTT - Activated Partial Thromboplastin Time

INR - International Normalized RatioADL – Activities of Daily Living

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REFERENCES

1. United Nations. World Population Ageing 2019. Department of Economic and Social Affairs, Population Division; 2019.
2. Tiwari P, Kumar A, Kulkarni SK. Polypharmacy: A global risk factor for elderly people. J Clin Gerontol Geriatr. 2019;10(3):99–103. https://doi.org/10.1016/j.jcgg.2018.12.005
3. Maher RL, Hanlon J, Hajjar ER. Clinical consequences of polypharmacy in elderly. Expert Opin Drug Saf. 2014;13(1):57–65. https://doi.org/10.1517/14740338.2013.827660
4. Hajjar ER, Cafiero AC, Hanlon JT. Polypharmacy in elderly patients. Am J Geriatr Pharmacother. 2007;5(4):345–51. https://doi.org/10.1016/j.amjopharm.2007.12.002
5. Jylhävä J, Pedersen NL, Hägg S. Biological age predictors. EBioMedicine. 2017;21:29–36. https://doi.org/10.1016/j.ebiom.2017.06.005
6. Maher RL, Hanlon JT, Hajjar ER. Clinical consequences of polypharmacy in elderly. Expert Opin Drug Saf. 2012;11(1):59–68. https://doi.org/10.1517/14740338.2012.631910
7. Patel V, Kumar A. Geriatric pharmacotherapy challenges in India. Indian J Med Ethics. 2010;7(3):161–5. https://doi.org/10.20529/IJME.2010.054
8. Horvath S, Raj K. DNA methylation-based biomarkers and the epigenetic clock theory of ageing. Nat Rev Genet. 2018;19(6):371–84. https://doi.org/10.1038/s41576-018-0004-3
9. Lardenoije R, Iatrou A, Kenis G, et al. The epigenetics of aging and neurodegeneration. Prog Neurobiol. 2015;131:21–64. https://doi.org/10.1016/j.pneurobio.2015.05.002
10. Levine ME, Lu AT, Quach A, et al. An epigenetic biomarker of aging for lifespan and healthspan. Aging (Albany NY). 2018;10(4):573–91. https://doi.org/10.18632/aging.101414
11. McKinney BC, Murphy GG. The role of DNA methylation in synaptic plasticity and memory. Genes Brain Behav. 2006;5 Suppl 2:60–6. https://doi.org/10.1111/j.1601-183X.2006.00240.x
12. Meng H, Cao Y, Qin J, Song X. Mitochondrial dysfunction in aging: Molecular mechanisms and pathophysiological implications. J Clin Transl Res. 2019;5(3):89–102.
13. Mahoney FI, Barthel DW. Functional evaluation: The Barthel Index. Md State Med J. 1965;14:61–5.

e-ISSN: 3048-9814 (Online)
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14. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;12(3):189–98. https://doi.org/10.1016/0022-3956(75)90026-6

15. Moran S, Arribas C, Esteller M. Validation of a DNA methylation microarray for 850,000 CpG sites of the human genome enriched in enhancer sequences. Epigenomics. 2016;8(3):389–99. https://doi.org/10.2217/epi.15.114

16. Horvath S. DNA methylation age of human tissues and cell types. Genome Biol. 2013;14(10):R115. https://doi.org/10.1186/gb-2013-14-10-r115

17. Barski A, Cuddapah S, Cui K, et al. High-resolution profiling of histone methylations in the human genome. Cell. 2007;129(4):823–37. https://doi.org/10.1016/j.cell.2007.05.009

18. Koppers-Lalic D, Hackenberg M, Bijnsdorp IV, et al. Nontargeted next-generation sequencing-based exploration of the miRNA repertoire in extracellular vesicles from human plasma and urine. J Extracell Vesicles. 2014;3:23743. https://doi.org/10.3402/jev.v3.23743

19. Hilmer SN, Mager DE, Simonsick EM, et al. A drug burden index to define the functional burden of medications in older people. Arch Intern Med. 2007;167(8):781–7. https://doi.org/10.1001/archinte.167.8.781

20. World Medical Association. World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. JAMA. 2013;310(20):2191–4. https://doi.org/10.1001/jama.2013.281053

21. Marioni RE, Harris SE, Shah S, et al. The epigenetic clock and telomere length are independently associated with chronological age and mortality. Int J Epidemiol. 2015;44(4):1388–96. https://doi.org/10.1093/ije/dyu277

22. López-Otín C, Blasco MA, Partridge L, Serrano M, Kroemer G. The hallmarks of aging. Cell. 2013;153(6):1194–217. https://doi.org/10.1016/j.cell.2013.05.039

23. Olivieri F, Rippo MR, Procopio AD, Fazioli F. Circulating inflamma-miRs in aging and age-related diseases. Front Genet. 2013;4:121. https://doi.org/10.3389/fgene.2013.00121

24. Levine ME, Hosgood HD, Chen B, et al. DNA methylation age of blood predicts future onset of lung cancer in the women's health initiative. Aging. 2015;7(9):690–700. https://doi.org/10.18632/aging.100799

25. Gnjidic D, Hilmer SN, Blyth FM, et al. Polypharmacy cutoff and outcomes: five or more medicines were used to identify community-dwelling older men at risk of different adverse outcomes. J Clin Epidemiol.

e-ISSN: 3048-9814 (Online)
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2012;65(9):989–95. https://doi.org/10.1016/j.jclinepi.2012.02.018

26. Benetos A, Toupance S, Gautier S, et al. Influence of lifestyle factors on epigenetic age acceleration: a longitudinal study in elderly French cohort. Clin Epigenetics. 2021;13(1):162. https://doi.org/10.1186/s13148-021-01133-6
27. Houseman EA, Accomando WP, Koestler DC, et al. DNA methylation arrays as surrogate measures of cell mixture distribution. BMC Bioinformatics. 2012;13:86. https://doi.org/10.1186/1471-2105-13-86
28. Gellad WF, Grenard JL, Marcum ZA. A systematic review of barriers to medication adherence in the elderly: looking beyond cost and regimen complexity. Am J Geriatr Pharmacother. 2011;9(1):11–23. https://doi.org/10.1016/j.amjopharm.2011.02.004
29. Herceg Z, Vaissière T. Epigenetic mechanisms and cancer: an interface between the environment and the genome. Epigenetics. 2011;6(7):804–19. https://doi.org/10.4161/epi.6.7.16262
30. Scott IA, Hilmer SN, Reeve E, et al. Reducing inappropriate polypharmacy: the process of deprescribing. JAMA Intern Med. 2015;175(5):827–34. https://doi.org/10.1001/jamainternmed.2015.0324
31. Horvath S, Gurven M, Levine ME, et al. An epigenetic clock analysis of race/ethnicity, sex, and coronary heart disease. Genome Biol. 2016;17:171. https://doi.org/10.1186/s13059-016-1030-0
32. Viñuela A, Brown AA, Buil A, et al. Age-dependent changes in mean and variance of gene expression across tissues in a twin cohort. Hum Mol Genet. 2018;27(4):732–41. https://doi.org/10.1093/hmg/ddx424