

Case Report

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Case Report

A Tropical Fever- Mimicking a Surgical Emergency

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Abstract: Introduction: Dengue is a mosquito transmitted arboviral infection. In dengue fever spontaneous bleeding in different parts of body occurs; but spontaneous bleeding into rectus muscle leading to haematoma formation is rare. **Case Presentation:** A 72-year-old hypertensive female presented with high grade intermittent fever with chills and rigors for last four days. She was diagnosed to have dengue fever (NS1Ag -Reactive) on the day before admission. At admission, on examination she was found to be have dehydration. Immediately she was put on IV fluids, antiemetics and other supportive therapy. At admission she had low platelets, low haemoglobin, total leucocyte counts, with raised liver enzymes. On day 3 of illness, she had significant drop of haematocrit with low blood pressure and subsequently she managed with packed red blood cell (PRBC) transfusion. But on 9th day of illness, she has severe right iliac fossa pain mimicking acute appendicitis. CECT of abdomen showed soft tissue lesion in right lower abdomen (Inflammatory/ hematoma along rectus sheath) which was managed conservatively as per surgical opinion. 10 days past discharge she had no pain in right iliac fossa and size of hematoma was significantly reduced.

Discussion: In dengue fever, hematoma can be formed any vulnerable part in the but there are only a few cases reported to be having rectus sheath hematoma. Rectus sheath hematoma (RSRH) has been mistaken for many acute abdominal diseases like- acute appendicitis. Our case mimicked acute appendicitis and managed conservatively with IV fluids, analgesics, Blood transfusion as it fits into RSH type II. **Conclusion:** It is important to be vigilant in the patients who presents with abdominal pain in severe dengue cases. Prompt imaging in relevant areas could make the diagnosis and further treatment possible.

Keywords: dengue fever; rectus sheath hematoma; surgical emergency; acute appendicitis

Background

Dengue is a mosquito transmitted arboviral infection, which has become a disease of public health concern globally. It usually presents as fever with myalgia, body ache may often be complicated by bleeding, shock, organ involvement. Majority of patients present with fever, flu like symptoms, constitutional symptoms and some forms of plasma leakage. However, reports of dengue cases with organ involvement in the form of hepatitis, kidney injury, myocarditis, encephalitis, pancreatitis, acute respiratory distress syndrome (ARDS) are on the rise and this is called expanded dengue syndrome (EDS).⁽¹⁾ There has been reports of spontaneous bleeding in different parts of body but spontaneous bleeding into rectus muscle leading to haematoma formation is rare.⁽²⁾ We report an interesting case of spontaneous rectus sheath haematoma leading to severe right iliac fossa pain mimicking acute appendicitis which was formed during the recovery phase of dengue haemorrhagic fever (DHF).

Case presentation

A 72-year-old hypertensive female resident of Kolkata, West Bengal, India, presented with high grade intermittent fever with chills and rigors for last four days. She also had severe muscle pain, body ache, nausea and vomiting associated with fever. She was unable to eat or drink due to the illness. She did not have any cough, shortness of breath, urinary symptoms, altered bowel habits. She was on telmisartan 40 mg and hydrochlorothiazide 12.5 mg for control of hypertension. She was diagnosed to have dengue fever (NS1Ag -Reactive) on the day before admission. At admission, on examination she was found to be have dehydration, mild pallor, BP- 110/70 mm of Hg, Pulse- 122/min (regular), temperature- 102.6°F, SpO₂- 98% @ room air, alert, co-operative, chest- bilateral vesicular breath sounds, CVS- S1, S2 audible, Tender 2 cm hepatomegaly below right costal margin, no free fluid. Immediately she was put on IV fluids (volume calculated according to Holliday-Segar formula), antiemetics and other supportive therapy. At admission she had low platelets, low haemoglobin, total leucocyte counts, with raised liver enzymes. Serial blood parameters are mentioned in Table 1.

Table 1. Trends of blood parameters day-wise with associated clinical events.

Day of illness	Sample	Hb (gm/dl)	Hct	TLC (/cmm)	Platelet count (/cmm)	SGPT (IU/l)	SGOT (IU/l)	Phase /clinical events
Day 4	Admission	8.6	21.5	2,300	80,000	61	158	Febrile Phase
	Evening	8.7	22.8	2,200	70,000	-	-	
Day 5	Morning	9.1	26.9	1,400	60,000	98	232	Critical Phase
	Evening	9.1	25.0	1,200	69,000	-	-	
Day 6	Morning	9.4	28.4	1,700	30,000	176	548	Critical Phase; Severe Nausea and Vomiting; 1 unit of PRBC given
	Evening	7.0	21.4	1,600	22,000	-	-	
Day 7	Morning	8.2	23.5	2,500	30,000	190	534	Critical Phase; Nausea, vomiting present
	Evening	7.8	22.4	2,700	32,000	-	-	
	Morning	6.8	19.2	2,800	33,000	186	504	
Day 8	Evening	6.7	18.7	3,300	35,000	-	-	Critical Phase ended; Nausea, vomiting present; 1 unit of PRBC given; Stool for OBT- strongly positive
	Morning	7.8	22.7	4,300	40,000	178	456	
Day 9	Evening	7.6	23.9	4,200	45,000	-	-	Nausea, vomiting present; Severe RIF pain; 1 unit of PRBC given
	Morning	8.2	24.6	4,300	55,000	170	345	
Day 10	Evening	8.0	25.8	4,700	76,000	-	-	Nausea, vomiting subsided, RIF pain continued
	Morning	7.6	23.7	5,800	90,000	134	235	
	Evening	7.2	2.6	5,700	1,12,000	-	-	
Day 11	Morning	8.6	26.7	6,300	1,25,000	87	176	RIF tender mass felt; 1 unit of PRBC given
	Evening	8.9	27.9	7,600	1,56,000	-	-	
Day 12	Morning	8.5	27.0	8,900	2,12,000	67	112	Imaging showed right lower abdominal rectus muscle hematoma, 1 unit of PRBC given; antibiotics discontinued
	Evening	9.2	28.3	8,700	2,54,000	56	78	
Day 13	Morning							Mild RIF tenderness; discharged
Day 14	Morning							

On day 3 of illness, she had significant drop of haematocrit with low blood pressure (90/60 mm of Hg). So, she was immediately transfused packed red blood cell (PRBC). Her Blood culture, urine cultures were showing no growth. Malaria was not found in peripheral blood smear and on Day 7 of illness her Dengue IgM was reactive. After the initial hypotension and drop in haematocrit she continued to have low haemoglobin (7~8 gm/dl) with normal blood pressure (without antihypertensives). Initially she complained of severe nausea and vomiting due to raised liver enzymes. But on 9th day of illness, she has severe right iliac fossa pain mimicking acute appendicitis with continued nausea. There was no history of trauma during this period also. At that time her stool occult blood test was strongly positive. Immediately surgical opinion was sought for this new onset abdominal pain and as acute appendicitis was the primary differential diagnosis, she was again started on IV fluids, Ceftriaxone, IV metronidazole and other supportive therapy. CECT of abdomen showed soft tissue lesion in right lower abdomen (? Inflammatory/? hematoma along rectus sheath). [Picture 1].

Picture 1: Rectus muscle hematoma



After that antibiotics were discontinued in view of normalised total leucocyte and absence of fever. After 2~3 days of conservative management she was stable with mild tender right iliac fossa mass. On surgical opinion she was discharged with a device to do a follow up ultrasonography. 10 days past discharge she had no pain in right iliac fossa and size of hematoma was significantly reduced (from 11 cm X 3 cm to 4 cm X 2 cm) on sonography. On Follow up after 15 days she had no right iliac fossa pain or mass felt. On ultrasonography also there was very minimal hematoma.

Discussion

Rectus sheath hematoma (RSH) usually presents as bleeding within the rectus abdominis muscle sheath. This is commonly caused by ruptured epigastric vessels or a tear of the rectus muscle.(3) Usual known risk factors of spontaneous RSH are female gender, pregnancy, obesity, anticoagulant drugs, abdominal straining, severe vomiting, and intractable cough. (4) Complications in patients with DHF in the form of bleeding usually a result from the combination of thrombocytopenia, increased vascular fragility, increased fibrinolysis, pro-coagulation and anticoagulation factors imbalance.(5) In critical stage of DHF there is defervescence of fever and higher degree of plasma leakage and low platelet count, which in some cases may lead to circulatory failure or bleeding complications.(6) We did an extensive literature review of spontaneous hematoma in dengue fever which is shown in Table 2.

Table 2. Literature review of Spontaneous Hematoma in Dengue fever.

	Location	Sex	Age	Co-morbidities/Drugs	Presentation	Diagnosis	Treatment	Outcome
Our case 2023	India	F	72	HTN	RIF pain; Recurrent Vomiting (dengue hepatitis)	RSH (CT scan)	Conservative	Survival
Pahari et al. 2023(7)	Nepal	M	54	Nil	Left upper abdominal pain	Splenic sub-capsular hematoma (CT scan)	Conservative	Death
Kaushik et al. 2022(8)	India	F	48	Nil	Acute onset paraplegia with bladder and bowel dysfunction and anaesthesia below the umbilicus	Compression of spinal cord due to intradural hematoma at the D7-D8 level (MRI)	Emergency laminectomy with excision of the clot and Dural repair	Survival
Corré et al. 2022(9)	France	M	33	Nil	Chest pain	Coronary hematoma (angiography): Acute myocarditis (CMRI)	Conservative with dual antiplatelets	Survival
Siahann et al. 2022(10)	Indonesia	M	65	Nil	Altered consciousness and focal neuro-deficits	Subdural hematoma (CT scan)	Craniotomy	Survival
Chang et al. 2021(11)	Malaysia	F	59	DM	Hypotension	Retroperitoneal hematoma (Ultrasonography)	Associated with HLH and AIHA	Death
Ungtham makhun et al. 2021(12)	Thailand	M	22	Nil	Left upper abdominal pain	Splenomegaly with active contrast extravasation at spleen surrounded by hematoma, and generalized hemoperitoneum (CT scan)	Splenectomy	Survival

Mushtaq et al. 2020(13)	Pakistan	M	32	Nil	Decreased power in bilateral lower limbs and pain in right leg	Bilateral iliopsoas hematoma (CT scan)	Conservative Survival
Matthias et al. 2019(14)	Sri Lanka	M	28	Nil	Left groin and inguinal region	Left psoas haematoma (Ultrasonography)	Conservative Survival
Baruah et al. 2018(15)	India	F	Not Mentioned	HTN, Bronchial Asthma, OSA	Acute quadripareis is with urinary incontinence	Cervicodorsal anterior epidural hematoma (MRI)	Surgical evacuation (durotomy) Death
Ghosh et al. 2018(16)	India	F	74	HTN	Recurrent Vomiting	RSH (CT scan)	Surgical evacuation for Abdominal Compartment Syndrome Survival
Tamilasra n et al. 2018(17)	India	M	36	Nil	Sore throat	Hematoma involving both the vocal cords and immediate subglottis (Video Laryngoscopy)	Conservative Survival
Anam et al. 2017(18)	Bangladesh	M	45	Nil	Left calf swelling	Calf muscle hematoma (Ultrasonography)	Surgical evacuation via fasciotomy Survival
Nelwan et al. 2017(19)	Indonesia	F	58	Nil	lower abdominal pain	RSH (Cullen's sign + CT scan)	Conservative Survival
Jayasinghe et al. 2016(20)	Sri Lanka	F	24	Nil	Headache, loss of consciousness, seizure	haemorrhages and sub arachnoid haemorrhages	Conservative as platelet count was 40,000/cmm (CT scan) Death
Singh et al. 2016(21)	India	M	30	Nil	RIF pain	Intra-parenchymal haematoma in the liver with extension to right peritoneum and right psoas	Conservative Survival

							muscle haematoma	
Sharma et al. 2014(22)	India	M	40	Nil	Severe pain in paraumbilical region, extending to right hypochondrium and lumbar regions	RSH (CT scan)	Conservative	Survival
Waseem et al. 2014(23)	Pakistan	M	55	HTN, DM, Aspirin	Pain in right upper quadrant of abdomen	RSH (CT scan)	Surgical Evacuation	Survival
Mehtani et al. 2013 (24)	India	M	36	Nil	Right forearm pain with tingling and compressing numbness along the distribution bundle (MRI) of ulnar nerve	Hematoma compressing ulnar nerve	Surgical evacuation	Survival with residual neuro-deficit
Sarkar et al. 2011(25)	India	M	Young	Nil	Inability to protrude his enlarged tongue and swollen was unable to speak	Tongue-his enlarged and swollen	Conservative	Survival
Mittal et al. 2011(26)	India	F	27	Nil	Recurrent seizure	Bilateral subdural haematoma (MRI)	Conservative	Survival with residual neuro-deficit
Tong et al. 2010(27)	Republic of Singapore	F	37	Adenomyosis, OCP	RIF pain	RSH (CT scan), Anti-DVT (US doppler)	Anti-coagulation after stabilisation	Survival
Seravali et al. 2008(28)	Brazil	M	27	Nil	Shock	Spleen congested with rupture of middle third and peri-splenic hematoma (Intra-operative)	Splenectomy	Survival
Seravali et al. 2008(28)	Brazil	M	20	Nil	Left upper abdomen pain	Splenic hematoma	Splenectomy	Survival

						(Ultrasonography)
Miranda et al. 2003(29)	Brazil	M	27	Nil	Diffuse abdominal pain	Splenic hematoma (CT Splenectomy Survival scan)

HTN- Hypertension; RIF- Right iliac fossa; RSH- Rectus sheath hematoma; CT scan- Computed tomography scan; MRI- Magnetic resonance imaging; CMRI- Cardiac Magnetic resonance imaging; HLH- Hemophagocytic Lymph histiocytosis; AIHA- Auto-immune haemolytic anaemia; DVT- Deep vein thrombosis.

We can see from this literature review that maximum cases were reported from South East Asia as dengue fever mostly endemic here. There were slightly more males than females who had this spontaneous hematoma in different parts of the body in dengue fever. Age group was more in younger population. Majority had no co-morbidities. Hematoma can be formed any vulnerable part in the but there are quite a few cases reported to be having rectus sheath hematoma. Also, RSH did not need any surgical intervention; though splenic hematoma mostly managed with splenectomy. There were few mortalities when patient presented with cerebral or splenic hematomas.

RSH can be divided by the severity of haemorrhage as seen on CT scan. Type-I RSH are one sided hematoma contained only within the muscle. Type-II RSH is bilateral hematomas/ hematomas not contained within the muscle sheath. Type-III RSH is called when blood enters the pre-vesicular space or peritoneum. Usually type I & II RSH can be managed conservatively but type III usually needs surgery. Treatment of spontaneous RSH is generally conservative including resuscitation, correction of coagulopathy, analgesia and treatment of the underlying condition.(30) Interventional radiological intervention and embolization is preferred in cases of continued bleeding with surgery being considered as the last option.(31) RSH has been mistaken for many acute abdominal diseases like- acute appendicitis, dissecting abdominal aneurysm, cholecystitis and biliary colic, cholelithiasis, diverticular disease, peptic ulcer disease, acute gastritis, obstructed intestinal hernias. Our case mimicked acute appendicitis and managed conservatively with IV fluids, analgesics, Blood transfusion as it fits into RSH type II.

In conclusion, it is important to be vigilant in the patients who presents with abdominal pain or any neuro-deficit during convalescent phase of dengue fever. Because it could be a presenting symptom of spontaneous hematoma in different parts of the body. Prompt imaging in relevant areas could make the diagnosis and further treatment possible.

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References

1. Kalayanarooj S. Clinical Manifestations and Management of Dengue/DHF/DSS. *TropMedHealth*. 2011;39(4SUPPLEMENT):S83–7.
2. Azeredo EL de, Monteiro RQ, de-Oliveira Pinto LM. Thrombocytopenia in Dengue: Interrelationship between Virus and the Imbalance between Coagulation and Fibrinolysis and Inflammatory Mediators. Yeh TM, editor. *Mediators of Inflammation*. 2015 Apr 27;2015:313842.
3. Aktürk OM, Kayilioğlu SI, Aydoğan İ, Dinç T, Yıldız B, Cete M, et al. Spontaneous Rectus Sheath Hematoma: an Overview of 4-Year Single Center Experience. *Indian J Surg*. 2015 Dec;77(S3):1219–21.
4. Eckhoff K, Wedel T, Both M, Bas K, Maass N, Alkatout I. Spontaneous rectus sheath hematoma in pregnancy and a systematic anatomical workup of rectus sheath hematoma: a case report. *J Med Case Reports*. 2016 Dec;10(1):292.
5. Wills BA, Oragui EE, Stephens AC, Daramola OA, Dung NM, Loan HT, et al. Coagulation Abnormalities in Dengue Hemorrhagic Fever: Serial Investigations in 167 Vietnamese Children with Dengue Shock Syndrome. *CLIN INFECT DIS*. 2002 Aug;35(3):277–85.
6. Martina BEE, Koraka P, Osterhaus ADME. Dengue Virus Pathogenesis: an Integrated View. *Clin Microbiol Rev*. 2009 Oct;22(4):564–81.
7. Pahari S, Basukala S, Kunwar P, Thapa K, Khand Y, Thapa O. Spontaneous splenic hematoma secondary to dengue infection: a rare case report. *Annals of Medicine & Surgery*. 2023 Apr;85(4):1030–3.

8. Kaushik RM, Kumar R, Kaushik M, Saini M, Kaushik R. Spontaneous spinal intradural hemorrhage in dengue fever: a case report. *J Med Case Reports*. 2022 Dec;16(1):213.
9. Corré J, Vally S, Boiron P, Bouillaud Y, Travers J. Spontaneous coronary hematoma concomitant with myocarditis: the first report of double cardiac complication of dengue. *ESC Heart Failure*. 2023 Apr;10(2):1445–8.
10. Siahaan AMP, Tandean S, Saragih EB, Nainggolan BWM. Spontaneous acute subdural hematoma in dengue fever: Case report and review of the literature. *International Journal of Surgery Case Reports*. 2022 Sep;98:107512.
11. Chang CY. A Fatal Case of Dengue-Associated Hemophagocytic Lymphohistiocytosis and Retroperitoneal Hematoma in a Patient With Autoimmune Hemolytic Anemia. *Cureus* [Internet]. 2021 May 13 [cited 2023 Sep 9]; Available from: <https://www.cureus.com/articles/58589-a-fatal-case-of-dengue-associated-hemophagocytic-lymphohistiocytosis-and-retroperitoneal-hematoma-in-a-patient-with-autoimmune-hemolytic-anemia>
12. Ungthammakhun C, Chueansuwan W, Changpradub D. Dengue Hemorrhagic Fever Complicated with Spontaneous Rupture of the Spleen among Patients with Thalassemia and G6PD Deficiency: A Case Report. *Arch Clin Med Case Rep* [Internet]. 2021 [cited 2023 Sep 9];05(06). Available from: <https://www.fortunejournals.com/articles/dengue-hemorrhagic-fever-complicated-with-spontaneous-rupture-of-the-spleen-among-patients-with-thalassemia-and-g6pd-deficiency-a-.html>
13. Mushtaque RS, Ahmad SM, Mushtaque R, Baloch S. A Curious Case of Dengue Fever: A Case Report of Unorthodox Manifestations. *Case Reports in Medicine*. 2020 Jul 26;2020:1–4.
14. Matthias AT, Apsara S, Epa A. A case report of dengue haemorrhagic fever complicated with psoas haematoma requiring blood transfusion. *BMC Infect Dis*. 2019 Dec;19(1):385.
15. Baruah S, Dubey S, Ghavghave U, Jha AN. Dengue Fever Presenting with Cervicodorsal Acute Spinal Spontaneous Subdural Hematoma—Case Report and Review of Literature. *World Neurosurgery*. 2019 Feb;122:272–7.
16. Ghosh S, Singh R, Ghosh S, Chawla A. Unusual surgical emergency in a patient of dengue haemorrhagic fever: spontaneous rectus sheath haematoma leading to abdominal compartment syndrome. *BMJ Case Reports*. 2018 Jul 10;bcr-2018-225936.
17. Tamilarasan V, Chandra MRKR, Mohan BVM, Kadambi M. Vocal cord hematoma: an unusual complication of dengue fever. *Egypt J Intern Med*. 2018 Sep;30(3):168–9.
18. Anam AM, Rabbani R, Shumy F. Spontaneous calf haematoma in severe dengue. *BMJ Case Reports*. 2018 Jan 26;bcr-2017-222932.
19. Nelwan EJ, Angelina F, Adiwinata R, Matondang S, Andriono P. Spontaneous rectus sheath hematomas in dengue hemorrhagic fever: A case report. *IDCases*. 2017;10:35–7.
20. Jayasinghe NS, Thalagala E, Wattegama M, Thirumavalavan K. Dengue fever with diffuse cerebral hemorrhages, subdural hematoma and cranial diabetes insipidus. *BMC Res Notes*. 2016 Dec;9(1):265.
21. Singh J. Retroperitoneal Haematoma in a Patient with Dengue Haemorrhagic Fever: A Rare Case Report. *JCDR* [Internet]. 2016 [cited 2023 Sep 9]; Available from: http://jcdr.net/article_fulltext.asp?issn=0973-709x&year=2016&volume=10&issue=11&page=OD01&issn=0973-709x&id=8771
22. Sharma A, Bhatia S, Singh R, Malik G. Dengue fever with rectus sheath hematoma: A case report. *J Family Med Prim Care*. 2014;3(2):159.
23. Waseem T, Latif H, Shabbir B. An unusual cause of acute abdominal pain in dengue fever. *The American Journal of Emergency Medicine*. 2014 Jul;32(7):819.e3-819.e4.
24. Mehtani A, Jha A, Kataria H, Jangira V, Shukla A. Acute Compressive Ulnar Neuropathy in a Patient of Dengue Fever: An Unusual Presentation. *Journal of Orthopaedic Case Reports*. 2013 Apr 17;3(2):25–8.
25. Sarkar J, Mohan C, Misra D, Goel A. Lingual hematoma causing upper airway obstruction: an unusual manifestation of dengue fever. *Asian Pacific Journal of Tropical Medicine*. 2011 May;4(5):412–3.
26. Mittal M, Jain N. Subdural haematoma and axonal polyneuropathy complicating dengue fever. *Case Reports*. 2011 Jun 17;2011(jun16 1):bcr1220103672-bcr1220103672.
27. Tong P, Yeoh C, Yong E. Abdominal mass and a forgotten haemorrhagic fever. *The Lancet*. 2010 Jul;376(9735):140.
28. Seravali MRM, Santos AHGD, Costa CEF, Rangel DTA, Valentim LF, Gonçalves RM. Spontaneous splenic rupture due to dengue fever: report of two cases. *Braz J Infect Dis*. 2008 Dec;12(6):538–40.
29. Miranda LEC, Miranda SJC, Rolland M. Case report: spontaneous rupture of the spleen due to dengue fever. *Braz J Infect Dis* [Internet]. 2003 Dec [cited 2023 Sep 9];7(6). Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-86702003000600011&lng=en&nrm=iso&tlang=en
30. Liao ED, Puckett Y. A Proposed Algorithm on the Modern Management of Rectus Sheath Hematoma: A Literature Review. *Cureus* [Internet]. 2021 Nov 29 [cited 2023 Sep 9]; Available from: <https://www.cureus.com/articles/75702-a-proposed-algorithm-on-the-modern-management-of-rectus-sheath-hematoma-a-literature-review>

31. Won DY, Kim SD, Park SC, Moon IS, Kim JI. Abdominal Compartment Syndrome Due to Spontaneous Retroperitoneal Hemorrhage in a Patient Undergoing Anticoagulation. *Yonsei Med J.* 2011;52(2):358.

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