CASE REPORT

SLE or hypothyroidism: who can triumph in cardiac tamponade?

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SUMMARY

A 36-year-old Hispanic woman with a history of systemic lupus erythematosus (SLE) in remission presented with progressive dyspnoea, bilateral leg swelling and increasing fatigue with rapid weight gain over the past few months. Her physical examination showed mildly tender thyromegaly and pericardial rub. Investigations showed new onset marked hypothyroidism as well as an active lupus serology with echocardiogram confirming severe pericardial effusion and a tamponade phenomenon. Urgent pericardiocentesis relieved her acute symptoms, and prompt treatment with thyroxine replacement and immunosuppression for lupus disease was initiated. Pericardial fluid analysis remained negative for any malignancy and/or infection/s. The patient had a gradual and consistent improvement with this treatment. She was discharged and appeared to be clinically stable at subsequent follow-up visits. However, the case remained a diagnostic dilemma over whether the tamponade was being driven by hypothyroidism versus lupus, leaving us with an opportunity to explore further.

BACKGROUND

Pericarditis with concomitant pericardial effusion and/or cardiac tamponade is a well-known complication of active systemic lupus erythematosus (SLE) disease as well as of advanced hypothyroidism. The association between hypothyroidism and pericarditis/pericardial effusion was first documented in the early 20th century¹ and, since then, this combination with linkage to tamponade has been well-described worldwide in the literature with numerous case reports and case series across all age groups.^{2–12} However, SLE is also another important aetiological factor for pericarditis and pericardial effusion, and their association with subsequent cardiac tamponade is well-established irrespective of stage of the disease, age and other factors.^{13–20}

However, due to better access to health coverage and diagnostic facilities, advanced cases of pericardial tamponade with severe hypothyroidism^{21 22} or with SLE^{20 23 24} are encountered less and less frequently. Moreover, to the best of our knowledge, there has been no case report in the current literature demonstrating a simultaneous association of hypothyroidism and SLE to cardiac tamponade. Our case described below reveals this unusual presentation.

CASE PRESENTATION

A 36-year-old Hispanic woman presented after a few weeks of generalised weakness, easy fatigability and throat discomfort. A review of her system was

positive for intermittent swelling of the face and 20 lbs weight gain over the past 6 months. In addition, she reported intermittent shortness of breath, bilateral leg swelling, headaches and left-sided neck stiffness. The patient also presented with symptom of irregular bowel movements with diarrhoea alternating with constipation and menstrual irregularities. Her medical history was significant for iron deficiency anaemia, SLE in remission with no current treatment and hypertension. Her physical examination was significant for mild thyromegaly with tenderness and a pericardial rub.

INVESTIGATIONS

Pertinent investigations showed normal complete blood count and basic metabolic panel, marked hypothyroidism with thyroid-stimulating hormone (TSH) level of 143 mIU/mL (normal range 0.4–4 mIU/mL), free thyroxine t4 0.3 ng/dL (normal range 0.9–1.9 ng/dL), elevated erythrocyte sedimentation rate (ESR) of 65 mm/h (normal range 0–20 mm/h) and raised C reactive protein (CRP) 3.6 mg/L (normal range <3 mg/L). The patient's antibody panel was significant for antinuclear antibody (ANA) positivity of 1:320 with speckled pattern, anti-Sjögren's syndrome-related antigen A antibody positive, anti-Smith antibody (Anti-Sm) positive, low complement levels with C3 31 mg/dL (normal range 75–140 mg/dL) and C4 4.5 mg/dL (normal range 10–54 mg/dL). Her thyroglobulin antibody titre was >3000 IU/mL (normal range <40 IU/mL) and thyroperoxidase antibody titre was >1000 IU/mL (normal range <35 IU/mL). Cardiac biomarkers remained within normal limits. ECG showed a high normal heart rate with sinus rhythm and non-specific ST-T wave changes with no signs of acute ischaemia. Chest roentgenogram showed marked cardiomegaly and normal lung parenchyma. Ultrasound scan revealed marked diffuse enlargement of the thyroid gland with heterogeneous hypoechoic parenchyma suggestive of Hashimoto's thyroiditis. Transthoracic echocardiogram showed large pericardial effusion with diastolic compression of the right atrium highly suggestive of cardiac tamponade.

DIFFERENTIAL DIAGNOSIS

Cardiac tamponade resulting from non-surgical aetiology has a wide array of differential diagnoses including, but not limited to, malignancy, collagen vascular diseases, postradiation effect, acute coronary syndrome with or without ruptured artery, viral infections, tuberculosis, uraemia, medications, severe hypothyroidism and idiopathic as a diagnosis of exclusion.^{25–28}

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In the case described above, normal ECG and cardiac enzymes, normal renal function and an absence of history of any causative medication usage or exposure to radiation, along with extremely elevated TSH and antibody markers positive for active SLE disease, narrowed down the differential diagnosis towards myxoedema and/or SLE as the likely diagnosis. However, other possibilities such as an undiagnosed malignancy, active chronic infections such as tuberculosis or viral diseases, and idiopathic aetiology, were still being considered.

TREATMENT

The patient was initially admitted to the telemetry floor, but after the echocardiographic finding of cardiac tamponade, she was immediately transferred to the coronary care unit. She was started on prednisone at 1 mg/kg/day and hydroxychloroquine 400 mg/day for active lupus. Oral thyroxine replacement of 150 µg/day for myxoedema was initiated as well. After stabilisation with supportive measures, cardiac tamponade needed an urgent intervention. Hence, under CT guidance, around 1200 mL of pericardial fluid was removed via an anterior approach with placement of a pigtail catheter. Pericardial fluid was haemorrhagic and exudative by fluid analysis as follows: fluid pH 7.64, total protein 7.3 g/dL, albumin 3.5 g/dL, cholesterol 66 mg/dL, glucose 96 mg/dL, lactate dehydrogenase (LDH) 214 U/L and uric acid 5 mg/dL.

The fluid tested negative for any infection, such as tuberculosis, with negative acid-fast bacilli (AFB) stains and subsequent negative cultures for bacteria/fungi/viruses. The cytological study did not reveal any malignant cells. Further laboratory studies showed negative cytoplasmic antineutrophil cytoplasmic antibody, antistreptolysin antibody, antiphospholipid antibody, but positive anti-Sm and antiribonucleoprotein antibody titres.

OUTCOME AND FOLLOW-UP

The patient's symptoms continued to improve steadily after pericardiocentesis along with continued immunosuppression and thyroxine replacement. The pigtail catheter was removed after 5 days. The patient was followed clinically with no further complications. Her thyroid function test and lupus serology were responding appropriately at 3-month and 6-month follow-up visits with gradual weight loss and overall improvement in general strength. At the 6-month follow-up visit, her investigations showed: TSH 0.9 mIU/mL, free t4 1.5 ng/dL, C3 level 55.5 mg/dL, C4 level 6.19 mg/dL, ESR 15 mm and CRP 1.75 mg/L. Doses of corticosteroid and thyroxine supplements were tapered down but still continued.

DISCUSSION

Severe hypothyroidism and active SLE are both proven aetiologies for the development of pericardial effusion/cardiac tamponade. In the case described above, the patient had one clinical condition, which became active (SLE); the other condition was diagnosed during this encounter (myxoedema). This makes it imperative to consider whether these diseases would have contributed individually or in combination to the extent of causing cardiac tamponade. We have briefly discussed clinical aspects of both scenarios.

Incidence of pericardial effusion in patients surveyed for untreated hypothyroidism varies from 30% to 78%.^{5–6} Prompt diagnosis and early treatment of hypothyroidism have been shown to significantly lower the incidence of pericardial effusion to 3–5%.⁷ Although the exact pathophysiology behind this association is not clear, experts agree that increased capillary permeability causing extravasations, decreased protein

metabolism, impaired lymphatic drainage and increased transit time across extravascular spaces in hypothyroidism cause proteinaceous fluid accumulations in serous cavities including pericardial, pleural and peritoneal cavities.²⁹ However, given the relatively slow accumulation of fluid in the pericardial space, tamponade with haemodynamic compromise is rarely seen in hypothyroidism.¹¹ Also, the baseline bradycardia in hypothyroid status can triumph over the tachycardia caused by tamponade, which might be the reason for normal heart rate in our patient. Thyroxine replacement is the key treatment and can reverse the pericardial effusion completely without further need for any intervention. However, cardiac tamponade requires immediate treatment for haemodynamic stability, and pericardiocentesis is an effective treatment. Surgical drainage with a pericardial window in appropriate cases can also be carried out with equal efficacy.³⁰ Caution must be advised with the rate of thyroxine replacement since conservative treatment can lead to recurrence of an effusion, whereas too rapid replacement can induce congestive heart failure.³¹

Although development of cardiac tamponade in active SLE is rare, it has been well described in the literature.^{15–19} Our case had lupus in remission for years with no active treatment at the time of presentation. Numerous case reports and series have been published showing tamponade as the first manifestation of SLE.^{18 21 22 32–34} Tamponade can develop even after successful treatment of an active flare of the disease.¹⁶ According to a retrospective study, a low C4 level has been shown to be predictive of development of tamponade.¹⁴ Reversible causes such as drugs should always be considered and ruled out first.^{20 35–39} Close monitoring is mandated for the development of sudden cardiac collapse and fatal cardiac arrhythmia.⁴⁰ Treatment consists of immediate pericardiocentesis either through the placement of a pericardial catheter or pericardial surgical window along with initiation of high-dose corticosteroids and immunosuppression.¹⁴

Pericardial fluid drainage with analysis is therapeutic and diagnostic in cardiac tamponade; our case fulfilled the criteria for pericardial fluid analysis as per 2004 European Society of Cardiology guidelines.⁴¹ Unlike peritoneal or pleural fluid analyses, biochemical parameters such as fluid protein/albumin, glucose, LDH and cell counts do not have a distinct role in pericardial fluid classification into exudate versus transudate, and most of them are exudates.⁴² Needle-guided pericardiocentesis and surgical pericardiotomy with a pericardial window remain the standard modalities to approach cardiac tamponade.⁴³ With the low definitive diagnostic outcome of an invasive pericardial biopsy⁴⁴ and the prompt recovery of our case on medical treatment, the team did not pursue this approach.

Autoimmune thyroid diseases are fairly common in patients with SLE, but with varying proportions (1–10%), as compared to the matched normal population across multiple ethnicities, and a reverse relation has been validated as well.^{45–51} A recent retrospective study showed that overall prevalence of thyroid diseases is lower in patients with SLE compared to the normal population but risk of hypothyroidism and autoimmune thyroiditis increases with overlap syndrome.⁵² However, there has been no clear association described in the literature between SLE and the development of hypothyroidism leading to cardiac tamponade.

Despite advances in diagnostic and therapeutic practices along with increased access to healthcare, our case is an example that cardiac tamponade physiology can always be a possibility. Hence, clinicians should always take into account this linkage while dealing with either of these clinical conditions. This case

is a rare example of presentation of cardiac tamponade in the presence of two well-established known aetiological factors: SLE and hypothyroidism. The dilemma still exists as to whether either of them individually or synergistically would have contributed to the development of tamponade physiology.

Learning points

- ▶ Severe hypothyroidism and myxoedema can always manifest as an acute or subacute presentation through cardiac tamponade and clinicians should, especially when there is no history of thyroid disorder, always consider this diagnosis as its first manifestation.
- ▶ Cardiac tamponade should always be considered in myxoedema, even in the absence of haemodynamic and cardiac instability, as these features can be masked with hypothyroidism.
- ▶ Systemic lupus erythematosus can present with a cardiac tamponade as its first manifestation, immediately following the treatment of an acute lupus flare, or even after years of clinical remission.
- ▶ Despite the presence of a clinical condition that can cause cardiac tamponade, the possibility of the existence of other concomitant clinical conditions that might also contribute to the development of tamponade physiology should always be kept in mind.
- ▶ In presence of one or more autoimmune disease/s, regular surveillance or monitoring should be conducted for the development of other autoimmune disease/s, since early diagnosis and prompt treatment can avoid future complications, as was seen in this case.

Contributors KPW and SM participated in the direct care of the case and identified the case. KPW and SSC wrote up the case with literature review. SM supervised the whole process and reviewed the final manuscript with all authors.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Gordon A. Some clinical aspects of hypothyroidism. *CMAJ* 1929;20:7–10.
- 2 Lin CT, Liu CJ, Lin TK, *et al.* Myxedema associated with cardiac tamponade. *Jpn Heart J* 2003;44:447–50.
- 3 Wang J-L, Hsieh M-J, Lee C-H, *et al.* Hypothyroid cardiac tamponade: clinical features, electrocardiography, pericardial fluid and management. *Am J Med Sci* 2010;340:276–81.
- 4 Arvan S. Pericardial tamponade in a patient with treated myxedema. *Arch Intern Med* 1983;143:1983–4.
- 5 Hardisty CA, Naik DR, Munro DS. Pericardial effusion in hypothyroidism. *Clin Endocrinol* 1980;13:349–54.
- 6 Kurtzman RS, Otto DL, Chepey JJ. Myxedema heart disease. *Radiology* 1965;84:624–30.
- 7 Kabadi UM, Kumar SP. Pericardial effusion in primary hypothyroidism. *Am Heart J* 1990;120(6, Part 1):1393–5.
- 8 Karu AK, Khalife WI, Houser R, *et al.* Impending cardiac tamponade as a primary presentation of hypothyroidism: case report and review of literature. *Endocr Pract* 2005;11:265–71.
- 9 Sharma N, Jain S, Kumari S, *et al.* Hypothyroidism—an unusual cause of cardiac tamponade. *Aust N Z J Med* 2000;30:731.
- 10 Rachid A, Caum LC, Trentini AP, *et al.* Pericardial effusion with cardiac tamponade as a form of presentation of primary hypothyroidism. *Arq Bras Cardiol* 2002;78:583–5.
- 11 Smolar EN, Rubin JE, Avramides A, *et al.* Cardiac tamponade in primary myxedema and review of the literature. *Am J Med Sci* 1976;272:345–52.
- 12 Martinez-Soto T, Deal C, Stephure D, *et al.* Pericardial effusion in severe hypothyroidism in children. *J Pediatr Endocrinol Metab* 2010;23:1165–8.
- 13 Yeh YH, Chu PH, Yeh CH, *et al.* Haemophilus influenzae pericarditis with tamponade as the initial presentation of systemic lupus erythematosus. *Int J Clin Pract* 2004;58:1045–7.
- 14 Rosenbaum E, Krebs E, Cohen M, *et al.* The spectrum of clinical manifestations, outcome and treatment of pericardial tamponade in patients with systemic lupus erythematosus: a retrospective study and literature review. *Lupus* 2009;18:608–12.
- 15 Miner JJ, Kim AHJ. Cardiac manifestations of systemic lupus erythematosus. *Rheum Dis Clin North Am* 2014;40:51–60.
- 16 Stone D, Moberg P, Respicio G, *et al.* Pericarditis with cardiac tamponade in systemic lupus erythematosus. Development immediately following successful control of lupus flare. *Lupus* 2010;19:890–1.
- 17 Lee IH, Yang SC, Kim TH, *et al.* Cardiac tamponade as an initial manifestation of systemic lupus erythematosus—single case report. *J Korean Med Sci* 1997;12:75–7.
- 18 Arabi MT, Malek EM, Fares MH, *et al.* Cardiac tamponade as the first manifestation of systemic lupus erythematosus in children. *BMJ Case Rep* 2012;2012:pii: bcr2012006927.
- 19 Weich HS, Burgess LJ, Reuter H, *et al.* Large pericardial effusions due to systemic lupus erythematosus: a report of eight cases. *Lupus* 2005;14:450–7.
- 20 Harnett DT, Chandra-Sekhar HB, Hamilton SF. Drug-induced lupus erythematosus presenting with cardiac tamponade: a case report and literature review. *Can J Cardiol* 2014;30:247.e11–12.
- 21 Butala A, Chaudhari S, Sacerdote A. Cardiac tamponade as a presenting manifestation of severe hypothyroidism. *BMJ Case Rep* 2013;2013:pii: bcr2012005281.
- 22 Ekka M, Ali I, Aggarwal P, *et al.* Cardiac tamponade as initial presenting feature of primary hypothyroidism in the ED. *Am J Emerg Med* 2014;32:683.e1–3.
- 23 Cheng W, Balachandrar R, Mistry P. Cardiac tamponade: an initial presentation of SLE. *BMJ Case Rep* 2013;2013:pii: bcr2013200011.
- 24 Sharda N. Cardiac tamponade as an initial manifestation of systemic lupus erythematosus in a child. *Cardiol Young* 2014;24:172–4.
- 25 Corey GR, Campbell PT, Van Trigt P, *et al.* Etiology of large pericardial effusions. *Am J Med* 1993;95:209–13.
- 26 Abdallah R, Atar S. Etiology and characteristics of large symptomatic pericardial effusion in a community hospital in the contemporary era. *QJM* 2014;107:363–8.
- 27 Ozturk E, Tanidir IC, Saygi M, *et al.* Evaluation of non-surgical causes of cardiac tamponade in children at a cardiac surgery center. *Pediatr Int* 2014;56:13–18.
- 28 Gibbs CR, Watson RDS, Singh SP, *et al.* Management of pericardial effusion by drainage: a survey of 10 years' experience in a city centre general hospital serving a multiracial population. *Postgrad Med J* 2000;76:809–13.
- 29 Parving HH, Hansen JM, Nielsen SL, *et al.* Mechanisms of edema formation in myxedema—increased protein extravasation and relatively slow lymphatic drainage. *N Engl J Med* 1979;301:460–5.
- 30 Becit N, Unlü Y, Ceviz M, *et al.* Subxiphoid pericardiostomy in the management of pericardial effusions: case series analysis of 368 patients. *Heart* 2005;91:785–90.
- 31 Kvasnickova H, Svejda J, Kvasnicka J, *et al.* Hypothyroidism with extensive pericardial effusion: different therapeutical approaches. Presented at Society for Endocrinology BES 2012, Birmingham, UK. *Endocrine Abstracts*. 2012;Vol 29:423.
- 32 Averbuch M, Bojko A, Levo Y. Cardiac tamponade in the early postpartum period as the presenting and predominant manifestation of systemic lupus erythematosus. *J Rheumatol* 1986;13:444–5.
- 33 Kahl LE. The spectrum of pericardial tamponade in systemic lupus erythematosus. Report of ten patients. *Arthritis Rheum* 1992;35:1343–9.
- 34 Lerer RJ. Cardiac tamponade as an initial finding in systemic lupus erythematosus. *Am J Dis Child* 1972;124:436–7.
- 35 Jacobs JC. Systemic lupus erythematosus in childhood report of thirty-five cases, with discussion of seven apparently induced by anticonvulsant medication, and of prognosis and treatment. *Pediatrics* 1963;32:257–64.
- 36 Carey RM, Coleman M, Feder A. Pericardial tamponade: a major presenting manifestation of hydralazine-induced lupus syndrome. *Am J Med* 1973;54:84–7.
- 37 Handler J. Hydralazine-induced lupus erythematosus. *J Clin Hypertens (Greenwich)* 2012;14:133–6.
- 38 Ghose MK. Pericardial tamponade: a presenting manifestation of procainamide-induced lupus erythematosus. *Am J Med* 1975;58:581–5.
- 39 Verma SP, Yunis N, Lekos A, *et al.* Carbamazepine-induced systemic lupus erythematosus presenting as cardiac tamponade. *Chest* 2000;117:597–8.
- 40 Huang CN, Yu HH, Chiu SN, *et al.* Acute myocarditis and ventricular fibrillation as initial presentation of pediatric systemic lupus erythematosus. *Rheumatol Int* 2013;33:1093–6.
- 41 Maisch B, Seferović PM, Ristić AD, *et al.* Guidelines on the diagnosis and management of pericardial diseases executive summary: the task force on the diagnosis and management of pericardial diseases of the European society of cardiology. *Eur Heart J* 2004;25:587–610.
- 42 Ben-Horin S, Bank I, Shinfeld A, *et al.* Diagnostic value of the biochemical composition of pericardial effusions in patients undergoing pericardiocentesis. *Am J Cardiol* 2007;99:1294–7.

- 43 Seferović PM, Ristić AD, Imazio M, *et al.* Management strategies in pericardial emergencies. *Herz* 2006;31:891–900.
- 44 Levy PY, Corey R, Berger P, *et al.* Etiologic diagnosis of 204 pericardial effusions. *Medicine (Baltimore)* 2003;82:385–91.
- 45 Paul R, Raychaudhuri P, Sinha PK, *et al.* Prevalence of systemic lupus erythematosus among patients of hypothyroidism in a tertiary care center. *Indian J Endocrinol* 2012;16:569–74.
- 46 Gao H, Li C, Mu R, *et al.* Subclinical hypothyroidism and its association with lupus nephritis: a case control study in a large cohort of Chinese systemic lupus erythematosus patients. *Lupus* 2011;20:1035–41.
- 47 Latif S, Jamal A, Memon I, *et al.* Multiple autoimmune syndrome: Hashimoto's thyroiditis, coeliac disease and systemic lupus erythematosus (SLE). *J Pak Med Assoc* 2010;60:863–5.
- 48 Kumar K, Kole A, Karmakar P, *et al.* The spectrum of thyroid disorders in systemic lupus erythematosus. *Rheumatol Int* 2012;32:73–8.
- 49 Bakr A, Laimon W, El-Ziny MA, *et al.* The emergence of systemic lupus erythematosus in hypothyroid patients: two case reports and mini review. *Lupus* 2014;23:825–8.
- 50 Antonelli A, Fallahi P, Mosca M, *et al.* Prevalence of thyroid dysfunctions in systemic lupus erythematosus. *Metabolism* 2010;59:896–900.
- 51 Viggiano DPP, da Silva NA, Montandon ACO, *et al.* Prevalence of thyroid autoimmune disease in patients with systemic lupus erythematosus. *Arq Bras Endocrinol Metabol* 2008;52:531–6.
- 52 Lin WY, Chang CL, Fu LS, *et al.* Systemic lupus erythematosus and thyroid disease: a 10-year study. *J Microbiol Immunol Infect* 2014;pii: S1684-1182(14)00058-9.

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