CASE REPORT

Scleroderma renal crises: case report and review of literature

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Abstract

Scleroderma (systemic sclerosis) is a connective tissue disorder which involves skin, gastrointestinal tract, kidneys and lungs with considerable morbidity. Scleroderma renal crisis is a well-known severe form of renal involvement, characterised by the presence of high blood pressure with variable degrees of renal insufficiency. We report a case of scleroderma renal crisis diagnosed on the basis of history of scleroderma, high blood pressure and renal dysfunction. The biopsy confirmed the typical histopathological findings. We discuss herein the management of the case and review the literature.

Keywords: Systemic scleroderma, Scleroderma renal crisis, Angiotensin-converting enzyme inhibitors.

Introduction

Scleroderma (systemic sclerosis) is a prototypical connective tissue disease. It involves almost all of the organs of the body and has a huge effect on the patient's quality of life. Scleroderma can involve kidneys in a variety of ways. Prior to the availability of angiotensin-converting enzyme (ACE) inhibitors, a major cause of morbidity and mortality in patients with scleroderma was scleroderma renal crisis (SRC). We present herein a case of scleroderma renal crisis that showed improvement with appropriate blood pressure control and institution of ACE inhibitors.

Case Report

A 60-year-old male presented through the outpatient department (OPD) with complaints of shortness of breath on exertion and vomiting for the preceding two months.

The patient was found to be hypertensive one year earlier with irregular follow-up. He had been recently admitted to another hospital about six months earlier with chronic constipation, abdominal pain, multiple joint pains and itching. The presence of characteristic clinical features led to the diagnosis of scleroderma. His serum creatinine gradually increased from 2.2mg/dl at presentation to 3.0 mg/dl at the time of discharge.

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On presentation at our hospital, the patient still had joint pains with morning stiffness, fatigue and inability to stand up from sitting position and generalised itching for the preceding months. On examination, blood pressure was found to be 150/100 mmHg, with generalised xerosis of the skin, hyperpigmented areas interspersed with hypopigmented areas, pallor, clubbing, microstomia and onycholysis. Chest examination revealed decreased breath sounds at the bases. Joint examination showed restriction of movement in multiple small and large joints without effusion. Rest of the examination was unremarkable.

Initial investigations showed the following: haemoglobin (Hb) levels to be 6.92g/dL; white blood count (WBC) 8.44x103/dL with normal differential; serum creatinine 8.7mg/dL; blood urea 273mg/dL; serum bicarbonate HCO3 22.4meq/L; serum ionised calcium 1.23mmol/L; serum sodium 131mmol/L; and serum potassium 3.8meq/L. Urine examination showed presence of proteins and no active sediment. Urine protein to creatinine ratio was 2.1. Anti-Scl-70 was positive. Serum intact parathormone level was 99.6pg/mL.

Ultrasonographic scan of the abdomen revealed normal-sized kidneys with grade two renal parenchymal changes and small pleural effusions bilaterally. There was no post-micturition residual volume. Echocardiogram (ECG) was suggestive of hypertensive and ischaemic heart disease.

Three units of packed red blood cells (RBCs) were transfused to stabilise the haemoglobin levels. A renal biopsy was carried out that revealed 29 glomeruli - arterial

Table:

Date	Serum Creatinine (mg/dL)	Blood Pressure (mmHg)	Anti-hypertensive Medications Used
27/11/10	8.7	180/100	Nifedipine Retard 20 mg BD. Methyldopa 250 BD.
4/12/10	8.1	150/80	Captopril 6.25 mg BD
7/12/10	8.0	140/80	Captopril 12.5 mg BD
9/12/10	8.2	140/80	Captopril 12.5 mg QID
16/12/10	7.8	140/80	Captopril 12.5 mg TDS
21/12/10	7.3	120/80	Captopril 25 mg TDS
28/12/10*	5.9	120/80	Captopril 25 mg TDS

*Follow-up visit one week later.

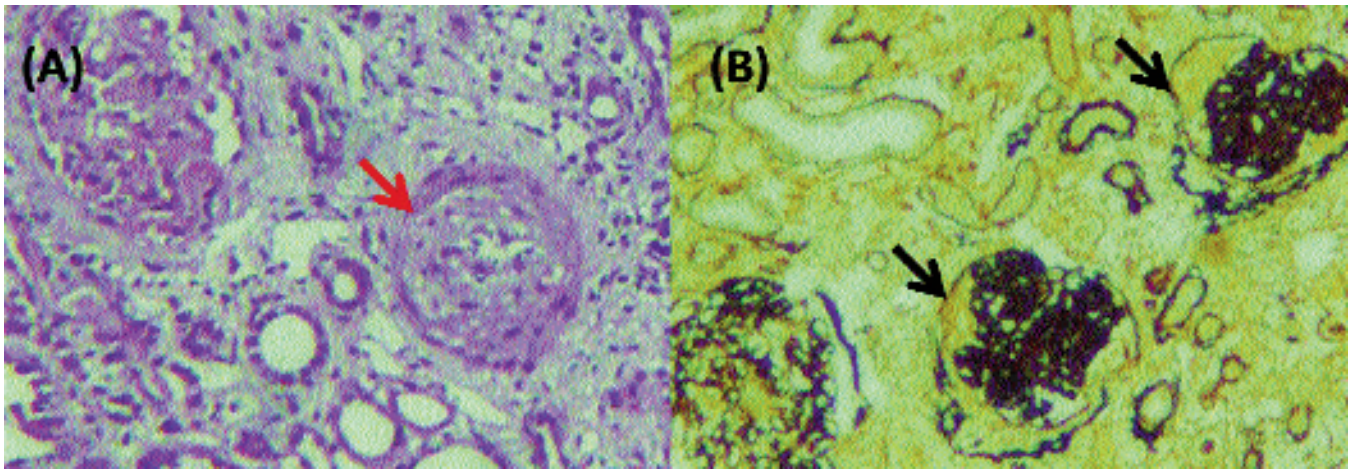

Figure: A) Hematoxylin and eosin (H&E) stain shows concentric hypertrophy (onion skin appearance) of blood vessel (red arrow). A sclerosed glomerulus is also seen with severe interstitial fibrosis. B) Silver methenamine stain showing two glomeruli with fibrous crescents (black arrow), and one with early segmental change.

wall showed marked thickening by concentric fibrosis and narrowing of the lumen (Figure 1-A); sclerosis and fibrous crescent formation was seen in 9 out of 29 glomeruli; atrophic tubules and interstitial fibrosis were also noted (Figure-1-B).

A diagnosis of scleroderma renal crisis was made. Treatment with short-acting ACE inhibitor was initiated at low dose (Table).

Follow-up visit after one week showed a downward trend of serum creatinine. Two weeks later, the patient was re-admitted with complaints of diarrhoea and vomiting. He had undergone tooth extraction and received non-steroidal anti-inflammatory drugs (NSAID) and antibiotics four days earlier. On presentation, he was dehydrated, and serum creatinine had again increased to 7.3mg/dL while serum electrolytes were normal. He was rehydrated and antibiotics were initiated.

On the second day of admission, he was found to be confused and later comatose. Evaluation suggested brainstem stroke and 24 hours later he developed cardiopulmonary arrest and died.

Discussion

Renal involvement is common in systemic sclerosis. Our patient had all the characteristic features and serology supportive of systemic sclerosis and severe degree of renal crisis that responded to ACE inhibitor treatment.

SRC, a severe and life-threatening renal disease, develops in approximately 10% to 15% of patients with the diffuse cutaneous form of systemic sclerosis, and arises much less frequently in limited cutaneous systemic sclerosis.[1] SRC is an early complication of systemic sclerosis that almost invariably occurs within the first year of onset of the disease. In a series of 110 patients, renal crisis occurred at a median duration of 7.5 months from the onset of the disease.[2] Our patient had features suggestive of scleroderma for less than a year.

Risk factors for development of renal crises include the use of glucocorticoids,[2-4] diffuse skin involvement,[2,3,5] and presence of auto-antibodies directed against ribonucleic acid (RNA) polymerase.[6] Our patient did not receive steroids; however he did have diffuse skin involvement.

SRC is characterised by the following findings: acute kidney injury, abrupt onset of moderate to marked hypertension, and a urine sediment that is usually normal or reveals only mild proteinuria with few cells or casts.[7,8] Our patient had non-nephrotic proteinuria and no active sediment.

The characteristic histological finding is the presence of intimal proliferation and thickening that leads to narrowing and obliteration of the vascular lumen, with concentric "onion-skin" hypertrophy, as was also evident in our patient.[8]

Blood pressure control is the mainstay of therapy in SRC. Aggressive treatment of hypertension can stabilise or even improve renal function in up to 55-70% of the cases, if started before irreversible vascular injury has occurred.[9]

An ACE inhibitor is the agent of choice, leading to an improvement in blood pressure in up to 90% of patients by reversing the angiotensin II-induced vasoconstriction.[10] Nevertheless, the mortality is high and a poor outcome is common.[11]

Despite treatment with ACE inhibitors, approximately 20% to 50% of patients with SRC progress to end-stage renal disease. However, among patients with SRC who require dialysis during an acute episode, an appreciable proportion recover sufficient renal function to discontinue dialysis.[2,6]

Our patient had a very low glomerular filtration rate (GFR) and we opted to treat the SRC without dialysis due to the fact that financial burden for maintenance haemodialysis was of great concern in our patient. He did have improvement in the GFR, thus avoiding dialysis, but the condition deteriorated due to the use of NSAID and dehydration secondary to diarrhoea.

Conclusion

Scleroderma renal crisis, if diagnosed, deserves a trial of ACE inhibitors even at an advanced stage, with the likelihood of improvement of the kidney function.

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