Original Research Article

Association of Posterior Reversible Encephalopathy Syndrome with Renal failure.

Abstract

Background:

Posterior reversible encephalopathy syndrome is a clinicoradiological entity that is characterized by variable associations of seizure activity, consciousness impairment, headaches, visual abnormalities, nausea, vomiting and focal neurological signs. No large data exists on the association of Posterior reversible encephalopathy syndrome with renal failure.

Material and Methods:

This case series of five patients was collected to know the association of two conditions and evaluate outcome. All these patients were enrolled in a tertiary care hospital over a period of two years. . No informed consent was sought because the study was merely observational and did not demand deviations from standard.

Results:

Four patients presented with acute renal failure and one patient had established End stage renal disease. All the patients had hypertension at presentation besides other risk factors. All the patients had Magnetic Resonance imaging documented posterior reversible encephalopathy syndrome. Despite intensive management, two patients did not show any compromise in the control of blood pressure and died. This observed showed that association of renal failure increases mortality in patients with posterior reversible encephalopathy syndrome. However, our series is limited by small number of patients and hence no definite conclusions can be drawn from this observation.

Conclusion:

Posterior reversible encephalopathy syndrome should be considered in any patient of renal failure with neurological manifestations and aggressive management is warranted.

Key-words: Posterior reversible encephalopathy syndrome; Magnetic Resonance Imaging; Renal failure.

Introduction

Posterior reversible encephalopathy syndrome (PRES), characterized by transient neurological symptoms, including headache, altered mental status, seizures and visual impairment, is a well-known condition occurring in some patients hospitalised for acute illness (1). Neuroradiological study usually shows oedema involving the cerebral posterior regions (1–4). The most common causes of PRES are hypertensive encephalopathy, preeclampsia, eclampsia, cyclosporine A (CSA) neurotoxicity (5, 6). The distinctiveness of PRES is its reversibility both in terms of the clinical and radiological abnormalities after institution of appropriate treatment and removal of the precipitating factors. Although PRES is reversible once treatment is instituted, delayed diagnosis and therapy can result in permanent brain damage and neurological sequelae, such as chronic epilepsy (1, 2). Most of the literature available on PRES is from case reports and case series. PRES in patients with renal failure is not commonly described in literature. We could not find any large series describing the condition in patients with renal failure. This case series of 5 patients was collected to evaluate the course of disease and evaluate outcome in patients with renal failure.

Material and Methods:

All the patients were enrolled in a tertiary care hospital over a period of two years. Patients were taken from emergency department, intensive care unit (ICU) and specialty wards. Patient data was collected at the time of admission and during hospital stay. The data collected include patient demographics, clinical characteristics, laboratory parameters which include total leukocyte count, platelet count, kidney function tests,

urine examination and cultures. The clinical presentation and laboratory evaluation of the patients is shown in Table 1. PRES was diagnosed by Magnetic Resonance Imaging (MRI) of Brain.

Diagnostic workup and therapy was at the discretion of attending doctor. No informed consent was sought because the study was merely observational and did not demand deviations from standard clinical care. The outcome was defined by clinical and radiological improvement or death.

Clinical Presentation:

All the patients presented with headache, altered sensorium and hypertension. The hypertension in four patients was first time detected and one patient with known ESRD was on suboptimal doses of antihypertensives with poor compliance Case no 1 was a 34 year old female having ESRD and was on dialysis protocol. She was on suboptimal doses of antihypertensives with uncontrolled blood pressure record. She presented with accelerated hypertension with clinical presentation shown in the table 1. MRI of the brain showed hyperintense lesions in parieto-occipital regions and was suggestive of PRES (Figure 1).

Case no. 2 was a 14 year old boy who presented with generalized tonic clonic seizures (GTCS) and unconsciousness. Patient had high blood pressure, mild renal failure, and active urinary sediment. Patient gave history of upper respiratory tract infections two weeks before. Imaging studies showed hyperintense lesions in Parieto-occipital and cerebellar regions (Figure 2). The patient had high C-reactive protein levels besides high antistreptolysin O titers (> 600 units). The clinical presentation, biochemical profile and outcome of other patients is shown in table 1.

Laboratory evaluation:

All the patients had renal failure. Two patients had total leukocyte count in the upper range of normal and two patients had leukocytosis. The definite cause of leukocytosis could not be established and cultures were negative. However, these patients were empirically started on antibiotics for presumed occult sepsis. All the patients had MRI documented PRES. Follow up MRI in three patients was normal.

Management and outcome:

All the patients were managed in ICU settings. Intensive management was pursued for control of hypertension which included nitroglycerine infusion, Intravenous (I.V) Labetolol (SOS) and oral antihypertensive agents. Four patients (case no 1, 3, 4 and 5) were empirically started on antibiotics as septic screen revealed sterile cultures. The cause of sepsis was presumed to be occult. Two patients (case no 2 and 5) received I.V diuretics in addition. Three patients (1, 2 and 5) improved fully clinically and radiologically. Two patients required ventillatory support and died even after intensive management.

Discussion

PRES has been frequently associated with hypertensive emergencies, pre-eclampsia and treatment with immunosuppressive drugs. Less common causes include uremia, digitoxin toxicity and dialysis disequilibrium (7, 8). The association of PRES and renal failure has been reported in few case reports only (9, 10). No large data exists on this association. We report this first case series of PRES associated with renal failure. The presentation of PRES, its association with renal failure, course and outcome was studied. The reversibility of the syndrome was confirmed both clinically as well as by neuroimaging studies in three cases. In the rest of two cases, course of illness was complicated by sever sepsis and septic shock. Both patients died within 48 hrs of admission. The likely cause of PRES in our patients was accelerated hypertension and uremia. The cause of renal failure in three patients was thought to be due to hypertension and occult septicemia. In one patient (case no 2) however, renal failure was likely due to acute glomerulonephritis (postinfectious) and hypertension.

All the patients had hypertension at presentation. Four patients presented with acute renal failure and one patient had established ESRD. Two patients were managed in ICU and developed resistant hypertension with severe sepsis syndrome. Hypertension and sepsis was well controlled in other three patients and all three patients recovered fully. It was therefore observed that control of hypertension, aggressive treatment of infection and supportive care contributes towards favorable outcome.

The favored pathogenic theory for PRES suggests autoregulatory disturbance with hyperperfusion, resulting in the shifting of fluid from the intravascular compartment and consequent vasogenic edema (2). It is unknown why the posterior circulation is preferentially affected. A

possible explanation is the lower sympathetic innervation of posterior cerebral arterial circulation, with a consequent reduced autoregulation of already impaired cerebral areas (11). Acute renal failure otherwise carries high mortality and morbidity (12, 13). Further studies are needed to know whether increased mortality is due to complications by renal failure and uremia or combinations of two conditions per se.

The PRES presenting in renal failure with varied presentation and in different age groups suggests that the syndrome should be kept in the differential diagnosis of patients presenting with altered sensorium, seizures and hypertensive crisis irrespective of age. It will greatly help in patient management and better outcome. This study signifies that although PRES is a reversible entity but when complicated by conditions like renal failure, resistant hypertension or sepsis, condition may prove fatal.

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Table 1: Clinical and Biochemical characteristics of studied population

Patient data	1	2	3	4	5
SEX/AGE (years)	Female/34	Male/ 11	Female/58	Female/ 22	Male /50
PRESENTATION	Headache, Vomiting, Seizures, altered sensorium (7 days) / Hypertention for 8 years, End stage renal disease on dialysis for 4 years.	Altered sensorium, Generalized swelling of the body, decreased urine output and Headache (2 weeks).	Altered sensorium, Headache and Vomiting (10 days) / received chemotherapy 4 years back for breast cancer, in remission.	Fever, Headache, altered sensorium and seizures (5 days).	Headache , altered sensorium, decreased urine output and abdominal pain (5 days) / Hypertention for 6 years
B.P (mmHg)	230/120	170/110	220/110	220/120	180/100
Urine output (ml/day)	200	300	1100	1500	400
CREATININE (mg/dl)	7.8	2.5	3.5	6.4	3.5
UREA (mg/dl)	225	55	95	176	147
HEMOGLOBIN (g/dl)	9.4	11.6	11.3	9.2	10.2
WHITE BLOOD CELLS ($\times 10^9$/L)	10.31	22.8	9.8	14.6	10.2
PLATELET COUNT/ mm^3	153,000	318,000	185,000	121,000	123,000
PYURIA	Absent	Positive	Positive	Positive	Absent

PROTEINURIA	Negative	Negative	Negative	Negative	Negative
OUTCOME	Improved	Improved	Died	Died	Improved
FOLLOW UP MRI	Normal	Normal	Not applicable	Not applicable	Normal

B.P – Blood Pressure; MRI – Magnetic Resonance Imaging

Figure 1
MRI Brain

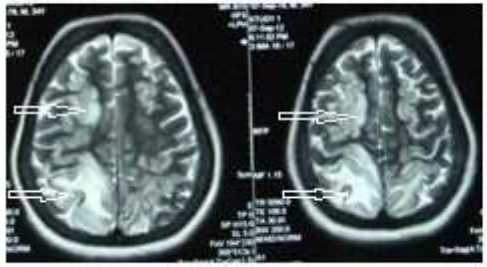

Figure 2
MRI Brain

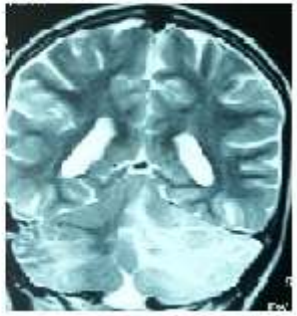

Figure 1. MRI brain (T2W) showing hyperintense lesions in parietoccipital regions suggestive of PRES

Figure 2. MRI (FLAIR) image of brain showing hyperintense lesions in parietoccipital regions with significant hyperintensities in cerebellar region