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CASE REPORT Open Access

Eosinophilic granulomatosis with polyangiitis (Churg–Strauss syndrome) imitating Guillain–Barre syndrome (GBS): a case report

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Abstract

Background: Eosinophilic granulomatosis with polyangiitis (EGPA) is associated with vasculitic neuropathy and being rare can present as subacute symmetric sensorimotor quadriparesis mimicking Guillain–Barre syndrome (GBS). It warrants timely diagnosis as treatment for both conditions is different and vasculitic neuropathy needs long-term immunosuppression. Nerve biopsy of our patient showed eosinophilic infiltration along with mononuclear infiltrate. Typical histopathological presentations of EGPA are different among different organs and eosinophilic infiltration is rarely observed in peripheral nerve and kidney involvements.

Case presentation: A 49-year-old female with a history of asthma with 3-week duration of acute onset ascending weakness, preceded by severe pain and burning in glove and stocking pattern. Nerve conduction studies could not rule out Guillain–Barre syndrome initially, but subsequent studies show axonal affection and she received intravenous immunoglobulin (IVIg) but her weakness progressed after slight improvement. Her bloodwork revealed marked eosinophilia (> 50%) with computed tomography (CT) paranasal sinuses showing pansinusitis with background history of asthma led us towards eosinophilic granulomatosis with polyangiitis and later antineutrophil cytoplasmic antibodies came out positive with nerve biopsy showing perivascular mononuclear inflammation with eosinophils. She was started on steroids immediately and then received intravenous rituximab in view of long-term immunosuppression with maintenance steroids and on follow-up she improved.

Conclusion: Eosinophilic granulomatosis with polyangiitis is a small-vessel vasculitis associated with antineutrophil cytoplasmic antibodies with significant paranasal sinuses involvement. Mononeuritis multiplex is the most common presentation of vasculitic neuropathy of eosinophilic granulomatosis with polyangiitis, but they can mimic Guillain–Barre syndrome and should always be considered in the differential diagnosis, since the treatment strategies for these conditions are radically different.

Keywords: EGPA, Guillain–Barre syndrome, Vasculitic neuropathy, Mononeuritis multiplex, Case report

Background

Churg–Strauss syndrome is a small-vessel vasculitis associated with antineutrophil cytoplasmic antibodies (ANCAs). First described in 1951 by Churg and Strauss as a rare disease characterized by disseminated necrotizing vasculitis in association with asthma and eosinophilia and now renamed as eosinophilic granulomatosis with

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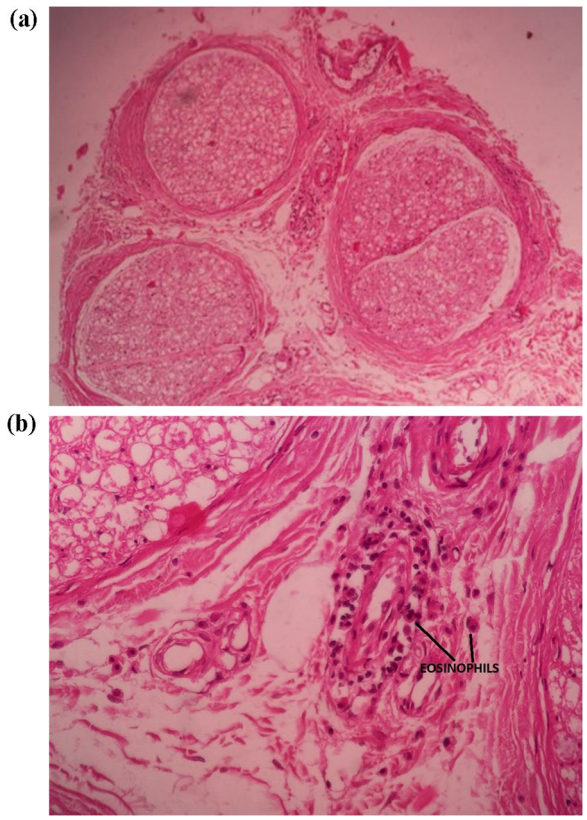

Fig. 1 **a** Cross section of a nerve. **b** Showing extravascular eosinophils

polyangiitis (EGPA) by Chapel Hill Consensus Conference (CHCC) in 2012. Among all the ANCA-associated vasculitis, Churg–Strauss is the rarest one with annual incidence and prevalence of 0.9–2.4 per million and 10.7–17.8 per million, respectively. Its median age of onset is 49–59 years with a slight female predilection. Jacob Churg and Lotte Strauss first described this entity in 1951 based on autopsy findings in a case series of 13 patients, who all had a similar pattern of illness with severe asthma, fever, eosinophilia and autopsy evidence of granulomatous necrotizing vasculitis [1]. Vasculitic phenotype is observed in patients who are ANCA positive and commonly present with myalgia, weight loss, migrating polyarthralgia, mononeuritis multiplex and glomerulonephritis. Patients without ANCA positivity tend to have a higher incidence of myocarditis. In 1990 the American college of rheumatology (ACR) developed criteria [2] for the classification of EGPA that included ascertainment of 4 or more of the following, which include (1) fleeting pulmonary opacities; (2) asthma (wheezing, expiratory rhonchi); (3) eosinophilia of more than 10% in peripheral blood; (4) paranasal sinusitis; (5) histological proof of vasculitis with extravascular eosinophils, and (6) mononeuritis multiplex or polyneuropathy. The presence of four or more criteria yields a sensitivity of 85% and a specificity of 99.7%. Peripheral nervous system involvement is quite common and noted in about 60% of patients at onset, mainly in the form of mononeuritis multiplex with distal symmetric polyneuropathy (24%), asymmetric polyneuropathy (3%), lumbar radiculopathy (3%) [2–7]. Pulmonary manifestations are mainly in the form of peripherally dominant migrating patchy infiltrates. Cardiac and gastrointestinal systems are less frequently involved and portend a poor prognosis. GBS is a clinical syndrome of an acute inflammatory polyneuropathy, characterized by mild sensory loss and ascending weakness with hypo- or areflexia, progressing to nadir over up to 4 weeks and may be associated with cranial nerve, bulbar, respiratory involvement and without or transient bladder involvement. Cerebrospinal fluid evaluation demonstrates albuminocytologic dissociation in 90% of cases. EGPA is associated with vasculitic neuropathy and being rare can present as subacute symmetric sensorimotor quadriparesis mimicking GBS. It warrants timely diagnosis as treatment for both conditions is different and vasculitic neuropathy needs long-term immunosuppression.

Case presentation

A 49-year-old woman, a known case of bronchial asthma for last 3 years, acutely developed severe pain in both lower limbs 20 days back followed by weakness after 5 days of onset of pain, associated with burning sensation in both feet. Patient first developed weakness in right lower limb followed by left within 48 h. Then she was referred to our institute and was found to have asymmetrical distal weakness in both lower limbs with intact power at hip and knee joint and normal upper limb examination. There was hyporeflexia in both lower limbs and diminished touch and pinprick sensation distally in lower limbs. There was no bladder, bowel or any cranial nerve involvement. Laboratory data showed positive C-reactive protein (CRP), and leucocytosis, cerebrospinal fluid (CSF) study was normal, whereas nerve conduction study (NCS) disclosed early motor demyelinating affection of bilateral tibial nerves and right peroneal nerve and motor demyelinating plus axonal affection of left peroneal nerve. Nerve conduction study was done using NIHON KOHDEN machine, model no KH-231B made in Japan, manufactured in 2013.

Keeping the possibility of acute inflammatory demyelinating polyneuropathy (AIDP), she received intravenous immunoglobulins (2 g/kg) along with analgesics. She showed some improvement and was discharged, but her weakness worsened on the 15th day of the illness progressing to both upper limbs. Examination revealed

Table 1 Other studies with history of asthma, eosinophilia and no improvement after IVIg were the clues towards the vasculitic neuropathy, and it was supported by ANCA positivity in majority of cases

	Study	Age	Presentation	Lab findings	NCS	Other	Treatment	Outcome
1	Ng et al. (1997)	58/M	Symmetric weakness, hyporeflexia, asthma	Eosinophilia, raised ESR, P-ANCA + ve	Mixed demyelinating polyneuropathy, multifocal absent F waves	Lung infiltrates	Steroids, cyclophosphamide, plasma exchange	Expired
2	Kevent et al. (1998)	57/M	Symmetric weakness, hyporeflexia	Raised ESR, P-ANCA + ve	Mixed demyelinating polyneuropathy, multifocal absent F waves	Nephritis	Steroids	Improved
3	Riva et al. (2008)	51/F	Asthma, nasal polyposis, symmetric weakness, hyporeflexia	Eosinophilia, raised ESR, P-ANCA -ve	Motor asymmetric axonal polyneuropathy, multifocal absent F waves		IVIg, steroids	Improved
4	Djukic et al. (2008)	74/M	Asthma, symmetric weakness, hyporeflexia	Eosinophilia	Mixed demyelinating polyneuropathy, multifocal absent F waves		Steroids, cyclophosphamide	Improved
5	Lemarroy et al. (2015)	36/F	Asthma, pansinusitis, purpura, symmetric weakness, hyporeflexia	Eosinophilia, raised ESR, P-ANCA + ve	Motor asymmetric axonal polyneuropathy		Steroids, cyclophosphamide	Improved
6	Bortolani et al. (2016)	68/F	Asthma, symmetric weakness, areflexia	Eosinophilia, P-ANCA + ve	Motor axonal polyneuropathy		Steroids	Improved
7	Yadav et al. (2017)	57/F	Asthma, symmetric weakness, hyporeflexia	Eosinophilia, proteinuria, P-ANCA + ve	Severe axonal and demyelinating polyneuropathy	Nephritis	Steroids, cyclophosphamide	Improved
8	Kim et al. (2018)	51/F	Asthma, asymmetric weakness, hyporeflexia, purpura	Eosinophilia, maxillary sinusitis, P-ANCA + ve	Sensory, motor, axonal, polyneuropathy		Steroids	Improved

ESR erythrocyte sedimentation rate, *P-ANCA* perinuclear antineutrophil cytoplasmic antibodies, *IVIg* intravenous immunoglobulin

Table 2 The revised five-factor score by French vasculitis study group

Factor
Age > 65 years
Presence of symptomatic cardiac insufficiency
Presence of severe gastrointestinal involvement (bowel perforation, bleeding, and pancreatitis)
Presence of renal insufficiency (creatinine > 150 mmol/L)
Absence of ear, nose, and throat symptoms

generalized areflexia, with 1/5 power at both ankle joint, 4/5 at knee joint and intact power at hip joint. In upper limbs 1/5 and 0/5 at right and left wrist joint, respectively, 4/5 at elbow joint and normal power at shoulder joint. Laboratory data revealed leucocytosis with eosinophilia (total leucocyte count {TLC}—21.26×10^9/L, eosinophils 51%), raised erythrocyte sedimentation rate {ESR} − 96 mm/h, positive rheumatoid factor and C-reactive protein, so her vasculitic workup was sent, which showed high titers of perinuclear antineutrophil cytoplasmic antibodies (p-ANCA—104.98 RU/ml). Her repeat NCS showed sensorimotor axonal-demyelinating affection of all nerves. Contrast enhanced computed tomography (CECT) of paranasal sinuses showed pansinusitis. Computed tomography (CT) thorax showed bilateral hyperinflated lung fields with flattening of diaphragm with few subcentimetric mediastinal lymph nodes.

After interpreting clinical and laboratory findings, diagnosis of Churg–Strauss syndrome was made [8]. Nerve biopsy revealed varying size nerve fascicles surrounded by thin perineurium; perivascular mononuclear inflammation and occasional eosinophils within the epineurium; suggestive of vasculitic changes (Fig. 1a, b). The patient received intravenous methylprednisolone 1 g/day, for 5 days, followed by oral prednisone (1 mg/kg per day). She also received non-steroidal anti-inflammatory drugs (NSAID's), opioids, gabapentin, topical analgesia for severe pain. She was also given intravenous rituximab (1 gm) in view of long-term immunosuppression with maintenance oral steroids. Her 2-dimensional echocardiography (2-D echo) and routine urine study came out normal. On follow-up her pain got better and

weakness also improved in right hand and foot (from 1/5 to 3/5) with improvement in appetite and body weight.

Conclusion

Peripheral neuropathy is quite common in EGPA and though not life threatening like myocardial or renal involvement, can lead to significant disability. One largest published series of patients with EGPA, 51.4–60% had peripheral neuropathy at presentation [9, 10]. Our patient presented with 3 weeks history of acute onset weakness of both lower limbs, preceded by severe pain with burning sensation in glove and stocking pattern, which further progressed to both upper limbs. Pain was the striking feature and required high-dose analgesics and opioids. Her blood work showed eosinophilia, CSF study came out normal and NCS showed early demyelinating affection in initial studies and sensorimotor axonal-demyelinating affection in subsequent studies with high titres of p-ANCA leading to the diagnosis of EGPA. In 1997, Ng et al. first reported a case which mimicked GBS both clinically and electrophysiologically, but it was later proved to be a case of EGPA due to findings of persistent eosinophilia, positive ANCAs, and eosinophilic vasculitis in a sural nerve biopsy [11]. Our patient with history of asthma, marked eosinophilia and deterioration despite of IVIg, led us to investigate for EGPA which was proved by positive ANCA and nerve biopsy. As we look at other studies history of asthma, eosinophilia and no improvement after IVIg were the clues towards the vasculitic neuropathy, and it was supported by ANCA positivity in majority of cases (Table 1).

Glucocorticoids are usually used as remission induction therapy, but patients experience frequent relapses during steroid tapering so long-term immunosuppression is often used. A five-factor score (FFS) to predict mortality risk in a large mixed cohort of microscopic polyangiitis (MPA), EGPA and polyarteritis nodosa (PAN) was developed by French vasculitis study group in 1996 [12] and then revised in 2011 [13] (Table 2).

Rituximab mediates killing of CD-20 lymphocytes by immune-mediated effects. A case series of 41 patients of EGPA by Mohammad et al. [14] showed that 80% of ANCA-positive and 38% of ANCA-negative patients achieved remission with rituximab suggesting that it is more effective in ANCA-positive patients. The efficacy of rituximab as remission induction agent compared to cyclophosphamide and as remission maintenance compared to azathioprine is being studied in two ongoing randomized placebo controlled trials (the REOVAS [NCT02807103] and MAINRITSEG trials [NCT03164473]).

Eosinophilic granulomatosis with polyangiitis is a small-vessel vasculitis associated with antineutrophil cytoplasmic antibodies with significant paranasal sinuses involvement. Mononeuritis multiplex is the most common presentation of vasculitic neuropathy of eosinophilic granulomatosis with polyangiitis, but they can mimic Guillain–Barre syndrome and should always be considered in the differential diagnosis, since the treatment strategies for these conditions are radically different.

Abbreviations

GBS: Guillain–Barre syndrome; EGPA: Eosinophilic granulomatosis with polyangiitis; ANCA: Antineutrophil cytoplasmic antibodies; PNS: Paranasal sinuses; IVIg: Intravenous immunoglobulin; CHCC: Chapel Hill Consensus Conference; CECT: Contrast enhanced computed tomography; ACR: American College of Rheumatology; CRP: C-reactive protein; CSF: Cerebrospinal fluid; NCS: Nerve conduction study; AIDP: Acute inflammatory demyelinating polyneuropathy; TLC: Total leucocyte count; ESR: Erythrocyte sedimentation rate; MPA: Microscopic polyangiitis; NSAIDs: Non-steroidal anti-inflammatory drugs; PAN: Polyarteritis nodosa; CT: Computed tomography; 2-D echo: 2-Dimensional echocardiography.

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Authors' contributions

MS collected the data and drafted the manuscript. MS was involved in the case directly, and has been involved in revising the manuscript for important intellectual content. DK supervised the making of this case report. RJ and VM were involved in the case. All authors read and approved the final manuscript.

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Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All patients included in this research gave written informed consent to publish the data contained within this study.

Competing interests

All authors disclose that they have no competing interests that could inappropriately influence this work.

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