POEMS syndrome – A case report revealing a complex evolving diagnosis

David N. Gachoka1,2 & Gregory Prince3

1Department of Internal medicine, The University of Toledo medical Center, 3000 Arlington Avenue, Toledo, Ohio, 43614
2Department of Internal medicine, Flower Hospital, 5200 Harroun Rd, Sylvania, Ohio, 43560
3Department of Pathology, Flower Hospital, 5200 Harroun RD, Sylvania, Ohio, 43560

Correspondence
David N. Gachoka, Internal medicine department, The University of Toledo medical Center, 3000 Arlington Avenue, Toledo 43614, OH. Tel: (619)-309-9544; Fax: (419)-882-7208; E-mail: David.gachoka@utoledo.edu, David.gachokamd@promedica.org

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Key Clinical Message
Description of POEMS syndrome (Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal gammopathy, Skin changes) goes back to 1938 when a patient with sensorimotor peripheral neuropathy, hyperpigmentation, solitary plasmacytoma, and elevated cerebral spinal fluid protein was reported. Since then, numerous other cases of this condition have been described by various authors including one that followed the first case 18 years later about two patients. Even though this rare condition still remains an oddity in diagnosis calling for clinicians to have a high index of suspicion due to its manifestation with varied clinical features. We present a case of POEMS syndrome that started as an episode of transient ischemic attack (TIA) and elevated levels of digestive enzymes not previously reported.

Keywords
Amylase, immunoglobulin, lambda light chain, lipase, monoclonal, smudge cells.

Case
A 98-year-old female presented to our emergency room (ER) with family after experiencing a 15-min episode of dysarthria while at home. She had been self-reliant until 4 months ago when she started to experience lower extremity weakness, mild loss of Lower extremities sensation, frequent episodes of tripping, and near fall at her house prompting her to move in with her daughter. On arrival to the ER, her speech had returned back to normal. Her medical history was only significant for a left breast mastectomy done 40 years ago due to ductal carcinoma in situ, hypothyroidism, and a well-controlled hypertension. Physical examination revealed an aged well-kempt female who was appropriate for age with good memory and mental status. Her cranial nerves were grossly intact. She had three none tender enlarged lymph nodes, each about 0.5 × 0.9 cm spread in her anterior and middle neck triangles. She also had notable mild bilateral lower extremities weakness, decreased sensation, and telangiectasia. Her home medications included levothyroxin 88 μg once daily and atenolol 25 mg once daily. Her vital signs were normal and stable. Stroke evaluation was commenced.

Laboratory data results were as follows: white blood cells (WBC) 11.6 × 10⁹/L, hemoglobin 12.1 g/dL, hematocrit 36.7%, absolute neutrophils 4 × 10⁹/L, absolute lymphocytes 7 × 10⁹/L, platelets 211 × 10⁹/L, band 4%, lymphocytes 67%, smudge cell +1, amylase 116 μL/L, lipase 105 μL/L, (thyroid stimulating hormone) TSH 91.69, Free T4 < 0.25, albumin 3.3, sodium 127 mmol/L, creatinine 1.3 mg/dL, Glucose 95, lactic acid 14, troponins 0.01 ng/mL, calcium 8.8 mg/dL, alkaline phosphate 82 μL/L, (aspartate transaminase) AST 27 μL/L, and (alanine transaminase) ALT 14 μL/L.

Abdominal series and chest X-ray showed large hiatal hernia, nonobstructive and nonspecific bowel gas pattern and numerous calcified granulomas throughout the lung. Computer tomographic (CT) imaging of the head without contrast showed no evidence of acute process but
presence of diffuse osteopenia, patchy demineralization, or sclerotic bone lesions throughout the calvarium that could relate to age or mild dysplastic process. CT abdomen and Pelvis showed a normal gastrointestinal tract and related organs.

Further analysis of complete blood count (CBC) was as follows: Peripheral smear showed absolute lymphocytosis composed of mature but mildly atypical lymphoid cells. Several smudge cells and small numbers of bands showing slight toxic granulation. Monocytes and platelets were unremarkable. Erythrocytes showed slight anisocytosis and ovalocytes (Fig 1).

Urine protein electrophoresis showed no evidence of monoclonal antibody. Serum protein electrophoresis showed protein tracing in (Fig 2). Serum protein electrophoresis fractions showing restriction band in gamma region measuring 0.79/dL and hypoalbuminuria (Table 1). Immunofixation gel scan showed IgG Lambda and faint IgM Lambda (Fig 3). Free light protein fractions showed elevated free Kappa and free Lambda light chains (Table 2). Lipase and amylase levels during the length of stay are as in (Fig 4).

**Discussion**

The etiology and incidence of POEMS (Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal gammopathy, Skin changes) syndrome remains currently unknown. Several theories including overproduction of interleukins or vascular endothelial factors (VEGF) have been advanced to explain the genesis of this disease [1, 2]. Similarly, the incidence of this syndrome remains unknown due to complexity of the clinical manifestations that are multisystem. Dispenzieri et al., [3] have come up with the criteria for diagnosis of POEMS syndrome which include major mandatory criteria, other major criteria and minor criteria. Major mandatory criteria include polyneuropathy and monoclonal plasma proliferative disorders. Both of these findings must be present in diagnosis of POEMS. For other major and minor criteria, only one or more of each is required as an addition to the major mandatory criteria to establish diagnosis. They include for other major criteria, sclerotic bone lesions, castleman’s disease, or elevated levels of vascular endothelia growth factors. Minor criteria include organomegaly, extravascular volume overload, endocrinopathy, skin changes, papilledema, and thrombocytosis or polycythe-

![Figure 1. Peripheral smear.](image1)

![Figure 2. Protein electrophoresis.](image2)

| Fractions  | %  | g/dL |
|-----------|----|------|
| Albumin   | 54.3| 3.3  |
| Alpha 1  | 2.5 | 0.2  |
| Alpha 2  | 9.3 | 0.6  |
| Beta     | 8.6 | 0.5  |
| Gamma    | 25.3| 1.5  |
| Peaks 1  | 11.2| 0.7  |

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mia. Our case patient fulfilled all the above criteria. On average, this syndrome presents in the fifth to sixth decade of life placing our case patient as an outlier [3]. The type of light chain seen in POEMS syndrome is almost always lambda [4]. This was confirmed from our immunofixation and free light protein fractionation results.

Of note is that on arrival to ER, our patient was ascribed a possible diagnosis of multiple myeloma after a reading of her head CT and CBC analysis. However, after reviewing her history and laboratory results, this diagnosis was negated on the premises of the prevailing polyneuropathy found almost exclusively in POEMS syndrome and the absence of anemia, hypercalcemia, or osteolytic bone lesions found in multiple myeloma [3]. The patient’s urine electrophoresis was also negative for myeloma proteins. Despite this, we were absolutely aware that about 3% of patients with multiple myeloma are nonsecretors of myeloma proteins [5]. Her renal function did return to normal after adequate oral hydration during her length of stay. We attributed her presenting hyponatremia to severe hypothyroidism [6] and increased her levothyroxin to 125 μg with plan for her to follow up with her primary care provider upon discharge. One finding on her laboratory results that we could not ascribe to POEMS syndrome was the elevated levels of amylase and lipase. During her entire stay, these enzymes stayed elevated with mild fluctuation. We also noted that the patient never complained of any symptoms or display any clinical manifestations as would be expected with this abnormality. She denied any history of alcohol use, pancreatitis, gall stones, or previous knowledge of this abnormality. She was even able to finish more than half of her daily meals before discharge without any abdominal pain. Her abdominal series and CT abdomen and pelvis results were also benign. After literature search, we failed to find support for previous case reports with such findings in POEMS syndrome. Due to the presence of smudge cells on the peripheral smear, we attempted to find out whether the patient had an underlying leukemia beside POEMS syndrome by doing flow cytometry. However, the patient’s family requested us to terminate further testing for them to continue conservative management at home. Despite this, we can report that even though the patient had presented with cervical lymphadenopathy, she never reported more than 10% weight loss within the last 6 months, fevers, night sweats, or extreme fatigue as would be associated with some chronic lymphocytic leukemia (CLL) patients [7]. Also, the pathologist was not convinced that the patient did have CLL going by the number of absolute lymphocytes in her

Table 2. Free light protein fractions showing elevated lambda and kappa proteins.

| Protein value | Name | Value | Range   | Unit |
|---------------|------|-------|---------|------|
|               | IGG  | 2150  | 694–1618| mg/day|
|               | IGa  | 337   | 69–378  | mg/day|
|               | igm  | 118   | 60–263  | mg/day|
|               | K free | 4.94  | 0.33–1.94| mg/day|
|               | L free | 3.66  | 0.57–2.63| mg/day|
|               | R K/L | 1.35  | 0.26–1.65| mg/day|

Figure 3. Protein immunofixation scan.

Figure 4. Digestive enzymes level during LOS.

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CBC. Lastly, presentation of transient ischemic attack or development of stroke in POEMS syndrome is rare as reported in Mayo clinic series where only 9.2% of the patients, \( n = 208 \) developed cerebral infarction at a mean age of 53 [8].

**Conclusion**

POEMS syndrome does present with a constellation of signs and symptoms that may lead a clinician to a multitude of other possible diagnosis. A good history and physical examination as well as careful review of all workup are paramount in establishing this particular diagnosis. The finding of elevated digestive enzymes in our case patient is novel and may still be another endocrine criterion that has not yet been documented in this syndrome.

**Conflict of Interest**

None declared.

**References**

1. Gherardi, R. K., L. Belec, M. Soubrier, D. Malapert, M. Zuber, J. P. Viard, et al. 1996. Overproduction of proinflammatory cytokines imbalanced by their antagonists in POEMS syndrome. Blood. 87:1458–1465. PubMed PMID: 8608236.

2. Scarlato, M., S. C. Previtali, M. Carpo, D. Pareyson, C. Briani, R. Del Bo, et al. 2005. Polynueopathy in POEMS syndrome: role of angiogenic factors in the pathogenesis. Brain 128(Pt. 8):1911–1920. PubMed PMID: 15975949.

3. Dispenzieri, A., R. A. Kyle, M. Q. Lacy, S. V. Rajkumar, T. M. Therneau, D. R. Larson, et al. 2003. POEMS syndrome: definitions and long-term outcome. Blood 101:2496–2506. PubMed PMID: 12456500.

4. Abe, D., C. Nakaseko, M. Takeuchi, H. Tanaka, C. Ohwada, E. Sakaida, et al. 2008. Restrictive usage of monoclonal immunoglobulin lambda light chain germline in POEMS syndrome. Blood 112:836–839. PubMed PMID: 18497319.

5. Kyle, R. A., M. A. Gertz, T. E. Witzig, J. A. Lust, M. Q. Lacy, A. Dispenzieri, et al. 2003. Review of 1027 patients with newly diagnosed multiple myeloma. Mayo Clin. Proc. 78:21–33. PubMed PMID: 12528874.

6. Hanna, F. W., and M. F. Scanlon. 1997. Hyponatraemia, hypothyroidism, and role of arginine-vasopressin. Lancet 350:755–756. PubMed PMID: 9297992.

7. Hallek, M., B. D. Cheson, D. Catovsky, F. Caligaris-Cappio, G. Dighiero, H. Dohner, et al. 2008. Guidelines for the diagnosis and treatment of chronic lymphocytic leukemia: a report from the International Workshop on Chronic Lymphocytic Leukemia updating the National Cancer Institute-Working Group 1996 guidelines. Blood 111:5446–5456. PubMed PMID: 18216293, Pubmed Central PMCID: PMC2972576.

8. Dupont, S. A., A. Dispenzieri, M. L. Mauermann, A. A. Rabinstein, and R. D. Brown, Jr. 2009. Cerebral infarction in POEMS syndrome: incidence, risk factors, and imaging characteristics. Neurology 73:1308–1312. PubMed PMID: 19841383, Pubmed Central PMCID: PMC2764416.