CMI Clinical Management Issues

Case Report

A Rare Case Report on Plummer-Vinson Syndrome with a Complication of Oral Cancer in a South-Asian Woman

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Abstract

Plummer-Vinson syndrome (PVS), also called "Paterson-Brown-Kelly syndrome", is a rare medical syndrome generally affecting middle-aged women. Iron deficiency anemia is the prime etiological factor and other probable factors include malnutrition, genetic predisposition, or autoimmune processes characterized by three distinctive features: iron deficiency anemia, dysphagia, and esophageal web. The dysphagia is generally painless and intermittent or progressive over years, restricted to solids, and associated with weight loss. The exact pathogenesis of PVS is still indistinguishable, but it is interconnected with iron deficiency anemia. Plummer-Vinson syndrome, if left untreated, carries an increased risk of developing squamous cell carcinoma of the upper alimentary tract.

In this case report, a 40-year-old female patient presented long-standing dysphagia for months, which progressively developed to postcricoid squamous cell carcinoma by the time she approached to medical treatment. Diagnosis was confirmed through laboratory tests, showing iron deficiency anemia and whole-body positron emission tomography-computed tomography (PET-CT) presenting squamous cell carcinoma in postcricoid region (hypopharynx).

Keywords: Paterson-Brown-Kelly Syndrome; Plummer-Vinson Syndrome; Iron Deficiency Anemia; Dysphagia; Squamous Cell Carcinoma; Postcricoid Region

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INTRODUCTION

Plummer-Vinson syndrome (PVS) or Paterson-Brown-Kelly syndrome is a rare entity associated with the classical triad of symptoms including microcytic hypochromic anemia, esophageal strictures, and dysphagia [1]. It affects predominantly females, in their 4th to 7th decade of life and is due to deprived nutritional status, multiparity, and menstrual blood loss. Three to fifteen percent of the patients affected by PVS have been reported to develop esophageal or pharyngeal cancer [2,3]. Precise data about incidence and prevalence of the syndrome are not identified, but in the first half of the 20th century it appeared to be common in Caucasians of Northern countries [4]. It is also common in countries with high possibility of iron deficiency; though, with improvement of nutritional status, it is extremely erratic nowadays [5]. It is hardly diagnosed in males and has also been described in children and adolescents [6,7].

The chief clinical features of Paterson-Brown-Kelly syndrome are postcricoid dys-

Why Do We Describe This Case

Despite Plummer-Vinson Syndrome (PVS) is very rare today, its identification is imperative as it affects a set of patients at increased risk of squamous cell carcinoma of the pharynx and the esophagus

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Parameter	Detected level	Normal range
Hemoglobin (g%)	6.5	12-16
Total RBC count (million/mm^3)	2.7	4.7-6.5
MCV (mm^3)	74	78-95
MCH (%)	24	25-30
PCV (Vol%)	20	40-54
Iron (µg/dl)	18	60-170
Ferritin (ng/dl)	10	12-150
Transferrin (mg/dl)	222	170-370
Total iron binding capacity (µg/dl)	270	240-450

Table I. *Laboratory findings at admission*

MCH = mean corpuscular hemoglobin; MCV = mean corpuscular volume; PCV = packed cell volume; RBC = red blood cells

phagia, upper esophageal webs, and iron deficiency anemia. The dysphagia is generally painless and intermittent or progressive over years, restricted to solids, and occasionally accompanied with weight loss. Symptoms subsequent to anemia such as weakness, pallor, fatigue, and tachycardia may lead the clinical presentation. Additionally, it is characterized by glossitis, angular cheilitis, and koilonychia (spoon-shaped finger nails). Enlargement of the spleen and thyroid may also be detected [8,9].

The diagnosis of Paterson-Brown-Kelly syndrome relies on detailed clinical history, general clinical examination, hematological investigation, and radiological examination. However, in the evolving countries numerous patients underestimate the importance of medical history about dental health and treatment.

CASE PRESENTATION

A 40-year-old female patient was admitted in Mahatma Gandhi Memorial Hospital (MGMH), Warangal, Telangana, India with chief complaints of gradually progressive dysphagia for solids in the past 3 months, hoarseness of voice, pain in both ears, and history of weight loss. On physical examination, the patient was cachectic with conjunctival pallor, pedal edema, cheilosis but without koilonychia. She had no history of smoking cigarettes, chewing tobacco, alcohol use, or drinking hot liquids. There was no family history of esophageal cancer. Table I reports laboratory findings at admission.

In particular, iron deficiency anemia should be noticed.

Diagnosis was made by performing the following tests:

- whole-body positron emission tomography-computed tomography (PET-CT) was done for stage evaluation of postcricoid growth (Figures 1 and 2). It was performed from vertex of skull to mid-thigh after injecting 10.9 mCi of F-18 fludeoxyglucose (FDG) and CT images were acquired after injecting IV contrast medium. In the neck region, an irregular heterogeneously enhancing lesion was detected, involving posterior pharyngeal wall and postcricoid region and measuring 2.7 cm × 1.7 cm. Therefore, the PET-CT scan confirmed hypermetabolic irregular enhancing soft tissue thickening in posterior pharyngeal wall and postcricoid region. The solid mass was neoplastic in nature;
- biopsy revealed well differentiated squamous cell carcinoma with stage T2 N2 M0;
- esophageal endoscopy was also performed and it showed ulcerated lesion in esophagus.

Therefore, this patient was finally diagnosed with Paterson-Brown-Kelly syndrome with a complication of postcricoid carcinoma. She was planned for radiation therapy. As her hemoglobin level was low, blood transfusion of 2 pints of packed red blood cells (PRBCs) was given and iron supplement medications (Inj. Orofer, Tab.

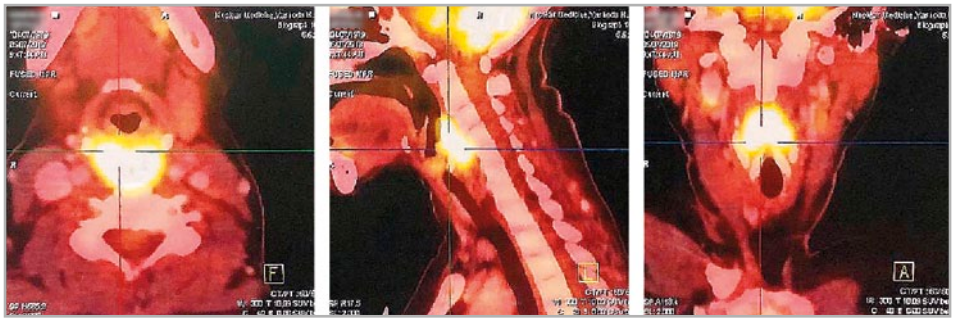

Figure 1. *Whole-body Positron Emission Tomography, neck region.*

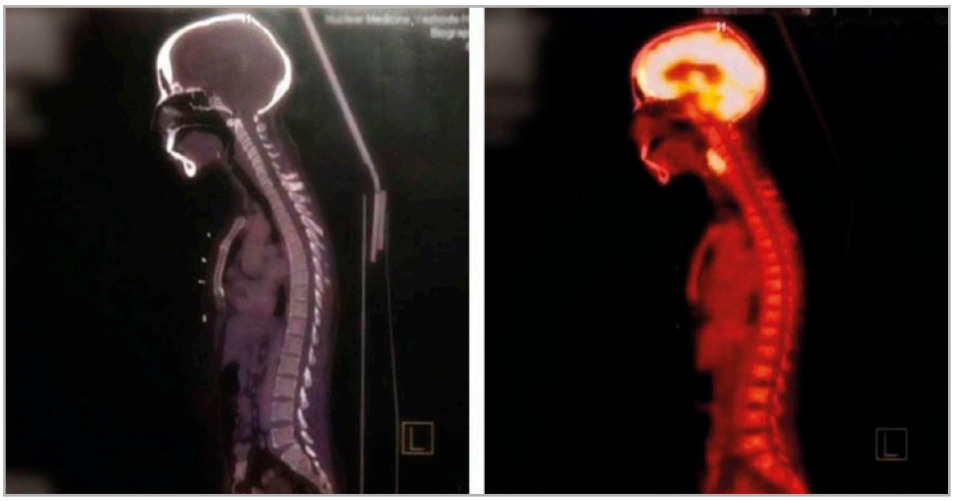

Figure 2. *Whole-body positron emission tomography-computed tomography (PET-CT).*

What should the clinician ask him/herself or the patient?

- *What is the clinical history of the patient in terms of dysphagia and diet?*
- *Does the physical examination reveal any anemic symptoms, like pallor, fatigue, malaise, and light-headedness?*
- *Does the patient notice any weight loss?*
- *What is the clinical history of the patient in terms of diseases, medications used, and blood transfusions?*
- *What is the clinical history of the patient in terms of menstrual health (amenorrhea/menorrhagia)*

Iron folic acid, Tab. Neurokind) were suggested in the treatment plan.

A slow improvement of dysphagia occurred after 2 weeks of oral iron therapy.

DISCUSSION

The pathogenesis of Paterson-Brown-Kelly syndrome is unknown. The most significant etiological factor is iron deficiency. This theory is chiefly based on the conclusion that iron deficiency is a part of the classic triad of Paterson-Brown-Kelly syndrome composed with dysphagia and esophageal webs and that dysphagia can be improved by iron supplementation. Certainly, impaired esophageal motility has been defined in Paterson-Brown-Kelly syndrome [10,11]. Myasthenic changes arise in muscles involved in the swallowing mechanism due to the depletion of iron-dependent oxidative enzymes. The rapid loss of iron-dependent enzymes causes web formation and ultimately lead to cancer development of the upper gastrointestinal tract [12-14].

It has been reported that malignity in the upper digestive system occurs in 3-16% of patients with PVS, and thus it has been suggested that yearly endoscopic controls should be performed for such patients [15,16]. Tissue iron plays a vital role in the propagation of epithelial cells. The physical signs of tissue iron deficiency include smooth tongue, angular cheilitis, and koilonychia, which were also observed in our patient, except koilonychia.

Besides, the epithelial layer of the upper alimentary tract is particularly liable to iron deficiency because of its high cell turnover [17-19]. Atrophy of the esophageal mucosa and formation of webs is seen as mucosal complications. These dysregulations were evident in the present case. Other etiologic factors, including malnutrition, genetic predisposition, or even autoimmune processes, have been proposed. The latter is based on the connotation between Paterson-Brown-Kelly syndrome and certain autoimmune disorders such as celiac disease (which was the most often mentioned associated disease in the case reports published in recent years), thyroid disease, and rheumatoid arthritis [20].

It has been proposed that dysphagia associated with Paterson-Brown-Kelly syn-

drome is improved by iron supplements [21], though in several cases the dysphagia did not respond to iron therapy and eventually required endoscopic dilatation or incision [22,23].

Here, we presented a rare case report on Paterson-Brown-Kelly syndrome in a 40-year-old woman, who developed postcricoid carcinoma. If this patient had presented earlier, when she had intermittent progressive dysphagia, her Paterson-Brown-Kelly syndrome could have been potentially treated and the cancer might have been prevented for further progression.

Early diagnosis is of utmost importance for a better prognosis and can be managed by iron supplementation and mechanical dilation. Likewise, esophageal webs may well relapse if iron deficiency recurs; therefore, careful follow-up is mandatory for these patients. Endoscopic surveillance is also crucial because of the risk of cancer.

CONCLUSION

Paterson-Brown-Kelly syndrome is a rare disease generally affecting middle-aged females.

Dysphagia is slowly progressive and patients often present with iron deficiency anemia. An early diagnosis is of the utmost importance, since, if left untreated, patients may develop upper alimentary tract cancer, as in the patient described in this article. She was treated with oral iron therapy, which deliberately improved dysphagia, and was planned for radiation therapy.

Key points

- *Paterson-Brown-Kelly syndrome or Plummer-Vinson syndrome (PVS) is a rare entity associated with the classical triad of symptoms, including microcytic hypochromic anemia, esophageal strictures, and dysphagia*
- *It generally effects middle-aged women*
- *After the initial diagnosis is confirmed, it can be managed by iron supplementation and mechanical dilation*
- *Noticeably, in this case report a slow improvement of dysphagia occurred after 2 weeks of oral iron therapy*
- *Early diagnosis is of extreme importance for better prognosis, since negligence may worsen the patient's condition, by increasing the risk for upper alimentary tract cancer, as in this patient, who developed postcricoid carcinoma*

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Conflicts of Interests

The authors declare that they have no competing interests.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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