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RESEARCH ARTICLE

Incidence and Outcome of Patterson-Kelly Syndrome in Thi-Qar Governorate / Iraq (2013-2022)

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Abstract

Background Patterson-Kelly Syndrome is an uncommon collection of signs and symptoms in the form of difficulty of swallowing, sideropenic anemia leading sometimes to koilonychias (scooped out nails) and post-cricoid web. This Syndrome which is also called Plummer-Vinson syndrome (PVS) is more commonly seen in females of middle age group and is associated with an increased possibility of malignancy in the form of Squamous Cell Carcinoma of the regions of GIT (terminal part of pharynx and beginning of esophagus). The etiology of Plummer Vinson syndrome remains unknown. Barium swallow radiography is the investigation of choice and the simplest and most accurate option to diagnose this uncommon syndrome. **Aim of study:** The purpose of this study is to show the importance of an uncommon syndrome called Plummer-Vinson Syndrome and it's classic triad of difficulty of swallowing, sideropenic anemia leading sometimes to koilonychias (scooped out nails) and post-cricoid web and that simple esophageal dilatation of the affected patient can change his/her fate and compare our study with other studies in the world. **Patients & Methods:** Our study is a retrospective study of fifty patients for whom management was applied over a period of about nine years (2013 - 2022). Most of our patients were exposed to simple esophageal dilatation under general anesthesia with excellent results. A minority of patients (10%) had been managed without dilatation by only correction of iron deficiency anemia. On admission into the hospital, history was taken from patients including age, onset and nature of signs and symptoms which are related to the syndrome itself. Other information included possible chronic illnesses, presence of previous surgical procedures and also history of drug allergy. **Results:** Females (80%) were more commonly affected than males by Plummer-Vinson Syndrome. The ages affected ranged from 30 years to more than 50 years but most of the patients' age ranged from 40 to 50 years. Regarding the signs and symptoms of patients at time of presentation , 100% of the patients had dysphagia associated always with iron deficiency anemia and significant number of our patients (80%) had obvious weight loss due to inability of having normal oral intake. No malignancy was found to be associated with Plummer-Vinson Syndrome at time of presentation but chronic illnesses like rheumatoid arthritis (10%), thyroid disease (20%) & rarely Crohn's disease (2%) were found as an associated disease. Malnutrition and vitamin B deficiency was a

common associated condition and found in most patients. Routine blood investigations and barium swallow were done for all cases but Computerized Tomography was carried out for a certain percentage (20%) of patients. All patients received management with good long term results and dilatation was the procedure of choice for 90% of patients while 10% of patients could be treated without need for dilatation by giving iron and vitamins supplements to the patient. Perioperative complications included bleeding, delayed recovery from anesthesia, sinus tachycardia & atrial fibrillation. No cases of perforation were recorded in our study and mortality rate was nil. **Conclusion & Recommendations:** 1. Dysphagia associated with iron deficiency anemia may be part of a syndrome called Plummer-Vinson Syndrome (Patterson-Kelly Syndrome). 2. Simple barium swallow is diagnostic for Plummer-Vinson Syndrome. 3. Most patients responded to simple mechanical dilatation which is usually carried out under general anesthesia with minimal complication rate. 4. No significant morbidity rate was observed. 5. No mortality rate was observed. 6. Excellent results were observed after dilatation of stenosed segment of esophagus in Plummer-Vinson Syndrome. 7. Careful follow up after dilatation of stenosed segment of esophagus in Plummer-Vinson Syndrome is mandatory to detect and treat complications as early as possible and to exclude malignancy. 8. Bleeding after mechanical dilatation in Plummer-Vinson Syndrome patients was controllable and was expected to occur due to tear of the web during procedure of mechanical dilatation. 9. Searching for associated conditions and disorders with Plummer-Vinson Syndrome like rheumatoid arthritis, thyroid disease and rarely Crohn's disease is indicated. 10. Major intervention including resection of segment of esophagus containing the web followed by end to end anastomosis or bowel interposition in cases of Plummer-Vinson Syndrome is contraindicated because of the excellent results obtained by simple mechanical dilatation. 11. Iron and vitamins supplements should always be offered to Plummer-Vinson Syndrome patients. 12. Follow up of Plummer-Vinson Syndrome patients is important because it is a premalignant condition.
Key Words: Plummer-Vinson Syndrome, Patterson-Kelly Syndrome, dysphagia, iron defiency anemia, sideropenic dysphagia, post-cricoid web.

1 | INTRODUCTION

Patterson-Kelly Syndrome is an uncommon syndrome in which the classic triad of difficulty of swallowing, hypochromic microcytic anemia and post-cricoid web is seen. Patterson-Kelly Syndrome is more commonly observed in females of middle-aged group and is associated with an increased possibility of malignancy in the form of Squamous Cell Carcinoma of the regions of GIT (terminal part of pharynx and beginning of esophagus). [1][2][3]

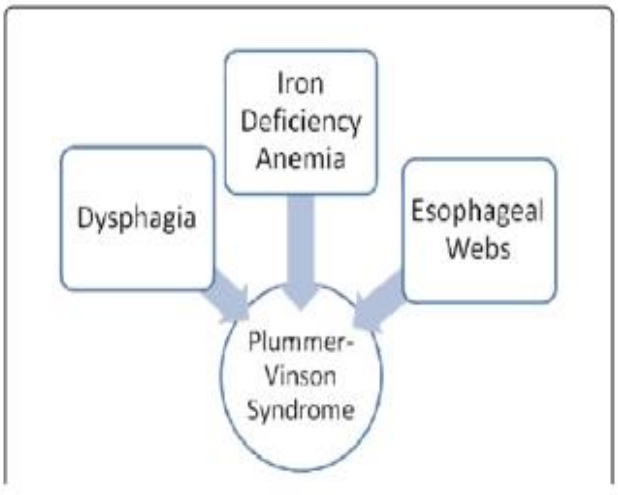

Figure 1. *Shows the triad of Patterson-Kelly Syndrome*

2 | ETIOLOGY

The cause of Patterson-Kelly Syndrome remains of unknown etiology. Although genetic factors and several other explanations have been suggested, the evidence remains weak, although iron deficiency appears to be the original factor in the pathogenesis. This is due to the fact that studies have confirmed an improvement in the clinical picture of affected patients especially regarding difficulty of swallowing after iron and vitamin supplementations as iron deficiency is suspected to cause mucositis which leads to web formation and stenosis of the cervical part of esophagus.

Supplementary information: *The online version of this article (https://doi.org/10.52845/rrarjmcs/2023/9-6-2) Contains supplementary material, which is available to authorized users.*

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Because patients with Patterson-Kelly Syndrome may also complain from weight loss, malnutrition and vitamin B deficiency. This leads to the fact that it has also been postulated as a main causative factor, although the evidence is inconclusive and not strong enough. Other conditions or diseases have been associated with Patterson-Kelly Syndrome including the followings:

1- Celiac disease

2- Croh'n disease

3- Rheumatoid arthritis

4- Thyroid disease

This fact raises the possibility of presence of autoimmune antibodies in the pathogenesis of Plummer Vinson syndrome, although this remains to be proven. [1], [2], [3], [4], [5]

3 | CLINICAL PRESENTATION

A large percentage of affected cases with Patterson-Kelly Syndrome are at the beginning without symptoms. Later, Patterson-Kelly Syndrome classically causes hypochromic microcytic anemia due to iron deficiency, post cricoid difficulty of swallowing and upper esophageal webbing.[2] In addition long-term iron deficiency anemia leads also to shortness of breath or difficulty breathing, rapid heartbeat, easy fatigability, pallor, and lastly but rarely koilonychias (spoon shaped nails). Furthermore glossitis and angular cheilitis may be seen. Enlargement of the spleen and thyroid gland may also be observed [2]. Post cricoid difficulty of swallowing is without pain and slowly progressing, starting initially with solid food. Then, dysphagia to liquids begins gradually and becomes more severe over the next several years of initial onset. Post cricoid difficulty of swallowing becomes clinically evident only when the stenosis in the segment of the esophageal web (post cricoid web) becomes very advanced (less than twelve mm).

Dysphagia in Plummer-Vinson syndrome is broadly divided into:

- Grade I which is defined as occasional dysphagia on taking solid food
- Grade II which is defined as ability to swallow soft (semisolid) food only and Grade II is considered more serious than Grade I. [6]

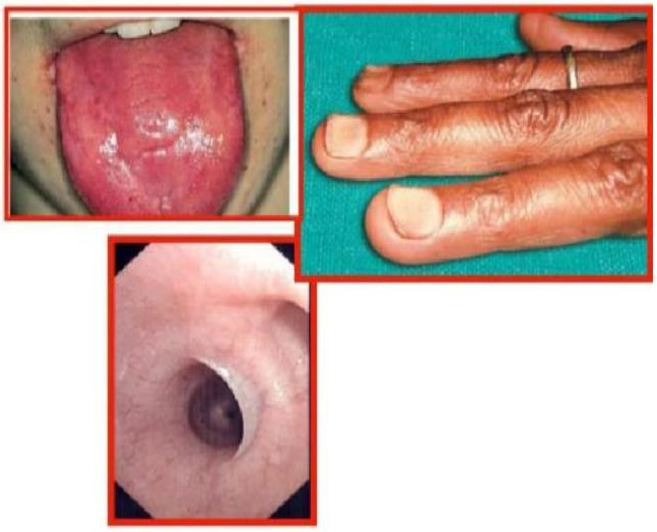

Figure 2. Shows glossitis & angular cheilitis of tongue, koilonychias (spoon shaped nails) and upper esophageal webbing in Patterson-Kelly Syndrome

4 | INVESTIGATIONS

The aim of investigations in a patient with suspicion of Patterson-Kelly Syndrome are: to diagnose hypochromic microcytic anemia due to iron deficiency, assess the severity and cause of dysphagia and to identify the site of obstructing web to help planning definitive management.

Therefore, the investigations include blood tests (CBC & blood film) & radiographic test (Barium Swallow) and possibly esophagoscopy and CT-scan of the neck and upper chest.

Hematologic tests

Hemoglobin concentration of blood is low, examination by light microscope of blood shows hypochromic microcytic RBCs with low MCV, low MCH and low MCH.

The iron & ferritin in the serum are low while binding capacity of total iron is elevated.

According to the Standard Health Organization of the world, a hemoglobin level of < **twelve gram/dL** in non-pregnant females or <**thirteen gram/dL** in males is used to define the term of anemia officially.

Deficiency of iron is regarded as the leading factor which leads to anemia if there is hypochromic & microcytic RBCs seen on blood film, serum ferritin level **is less than thirty µg/L** and MCV **is less than eighty fL**.

Radiography of the esophagus

The test of Barium swallow is the option of choice if there is suspicion of the presence of esophageal web. It has several advantages over endoscopic examination. It can be performed within short period of time, it is more easily available in rural areas and also is cheap and can be interpreted by any radiologist or physician with no special skills or training on radiography. In addition, it helps to differentiate between benign causes of obstruction from malignant causes, planning of definitive management, and provides a dependable baseline status before and after dilatation.

When the traditional Barium Swallow is either equivocal or negative and is not conclusive, then video fluoroscopy becomes mandatory as it provides a dynamic X-ray evaluation of the process of swallowing, as the barium material transfers from the mouth to the pharynx and esophagus. These techniques can detect smaller webs or lesions and can better differentiate between true webs due to Plummer-Vinson syndrome from false webs formed by mucosal folds or extrinsic pressure. However, they are not always available, especially in developing countries where Plummer-Vinson syndrome is common and the need for such investigations raises due to the widespread presence of people with iron deficiency and malnutrition. The webs are most commonly located anteriorly, but can be seen posteriorly. Less commonly, they are circumferential, with either a centrally located or eccentrically located opening. Although often single, more than one web can be seen but this is rare [3].

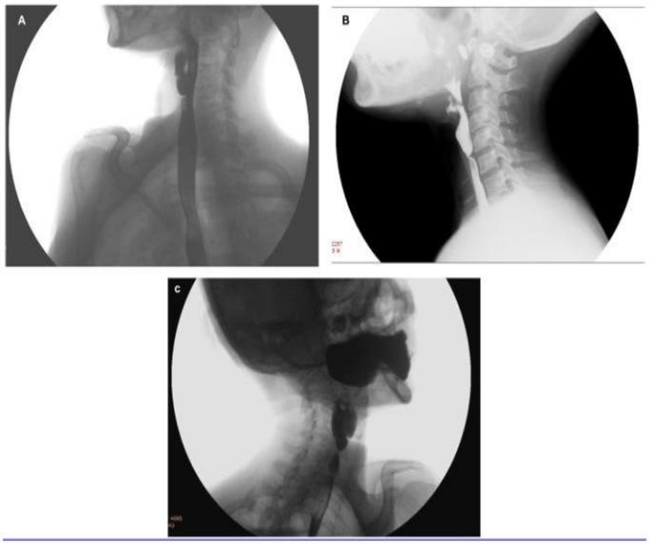

Figure 3. *Barium swallow test (lateral view) showing post cricoid web in Plummer-Vinson syndrome on*
(A) Anterior esophageal wall (B) Posterior esophageal wall (C) Circumferential web with a narrow residual opening leading to severe dysphagia

Video endoscopy

Esophagoscopy is a dependable and accurate method for examining the esophagus. Endoscopy has the advantage of allowing dilatation at the same session. In patients with suspicion of an esophageal web due to Plummer-Vinson syndrome, endoscopic examination has to be performed very carefully, preferably under anesthesia or sedation to avoid complications like perforation and profuse bleeding because these webs may be very thin and are located very near to the sphincter of upper most part of esophagus, an area which is traversed very rapidly and, therefore, is often not evaluated well during endoscopic procedure. [4]

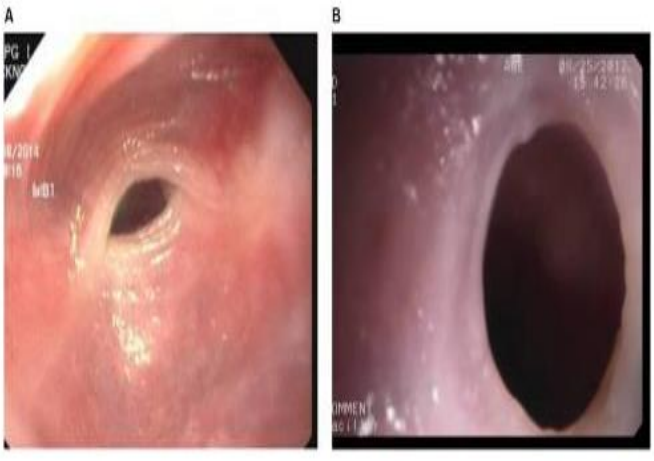

Figure 4. *Shows post cricoid web by endoscopy*

5 | TREATMENT AND MANAGEMENT

Patterson-Kelly Syndrome is commonly diagnosed and treated as cold case without need for being admitted into the hospital. Gastroenterologist consultation is necessary for the management of dysphagia requiring dilatation under general anaesthesia.

Diet:

Patients affected by Patterson-Kelly Syndrome must eat and chew slowly & thoroughly. Preferably, solid foods should be prepared carefully and cut in small pieces, especially meats before being eaten by the patient.

Medical treatment:

Iron and vitamins supplementation is mandatory to treat the hypochromic & microcytic anemia and malnutrition and to treat most of the signs and symptoms related to iron deficiency. Continued iron supplementation may be of value to prevent recurrence of signs and symptoms of the syndrome but it has not been confirmed yet. [7]

Difficulty of swallowing may improve with iron supplementation alone, especially in patients with small post cricoid webs [8]. Dysphagia associated with large obstructing webs is unlikely to respond to iron supplementation alone and, therefore, needs management with rigid esophagoscopy which is usually carried out under general anesthesia.

Treat dysphagia and the web:

In addition to iron replacement, diet modification may be sufficient in patients with mild symptoms. Those patients with severe long-term dysphagia usually require intervention in the form of mechanical dilatation under general anesthesia or sedation. The obstructing web can usually be disrupted during simple and single passage of the instrument into the esophagus. Otherwise, passage of a bougie dilator is quite effective. In most situations, passage of a single large dilator is fair enough and is thought to be more effective than serial progressive dilations. In a prospective study made on 37 patients, Goel & colleagues found that esophageal-web related dysphagia in patients with Patterson-Kelly Syndrome responded well after one session of endoscopic dilatation. Thirty-one symptomatic patients had dysphagia grade 1 (n = 12, 39%), 2 (n = 13, 42%), and 3 (n = 6, 19%) for a median duration of 24 months. After the first session of endoscopic dilatation, 29 out of 31 patients (94%) had a complete response and two patients (6%) had a partial response without any complications.[9] Fluoroscopic guidance is usually not required unless a tight web prevents further passage of the endoscope. The proximal location of the webs in Plummer-Vinson syndrome makes endoscopic balloon dilation difficult, but it has been carried out with good results by radiology under fluoroscopic guidance. [10, 11]

ND: YAG laser therapy has also been considered as a good means of disrupting the esophageal web due to Plummer-Vinson syndrome [11] .This modality is usually not needed.

Needle-knife electro incision has also been mentioned as a therapeutic alternative to dilation but is not used widely. [12]

Surgical treatment:

Surgical intervention is rarely indicated and is reserved for those patients whose esophageal webs are resistant to mechanical dilation or associated with other pathologies like Zenker diverticulum.

Long term monitoring

Follow-up complete blood picture, iron studies and vitamin level is necessary, after initiation of iron and vitamins supplementation, to ensure resolution of anemia and malnutrition.

6 | COMPLICATIONS

1- Patients with unmanaged Plummer-Vinson syndrome can lead to difficulty of swallowing for solid materials and possibly pneumonia due to aspiration.

2- Iron and vitamins deficiency may lead to the following symptoms (fatigue, malaise, shortness of breath, myocardial ischemia, poor function of muscles and nerves, poor concentration, depression, loss of motivation, etc……) if iron and vitamin supplementation are not provided

3-Patients may get Squamous Cell Cancer of the proximal esophagus because Plummer-Vinson syndrome is a premalignant condition.

4-Endoscopic management of the post cricoid web with mechanical dilatation or balloon dilatation is associated usually with mild bleeding due to disruption and tear of the web and there is a small risk of esophageal perforation which may lead to extravasation of contents of esophagus into the interstitium of neck but this occurs very rarely.

PROGNOSIS

Patients with Plummer-Vinson syndrome have a very good prognosis, with most symptomatic patients requiring only one session of esophagoscopy with dilatation to relieve the symptoms completely accompanied by supplementation of iron and vitamins.

Patients are liable of getting squamous cell carcinoma of the lower pharynx or upper esophagus, which may be due to irreversible mucosal changes leading to malignant degeneration of the area of the postcricoid web because of chronic iron deficiency but this needs to be confirmed [14]

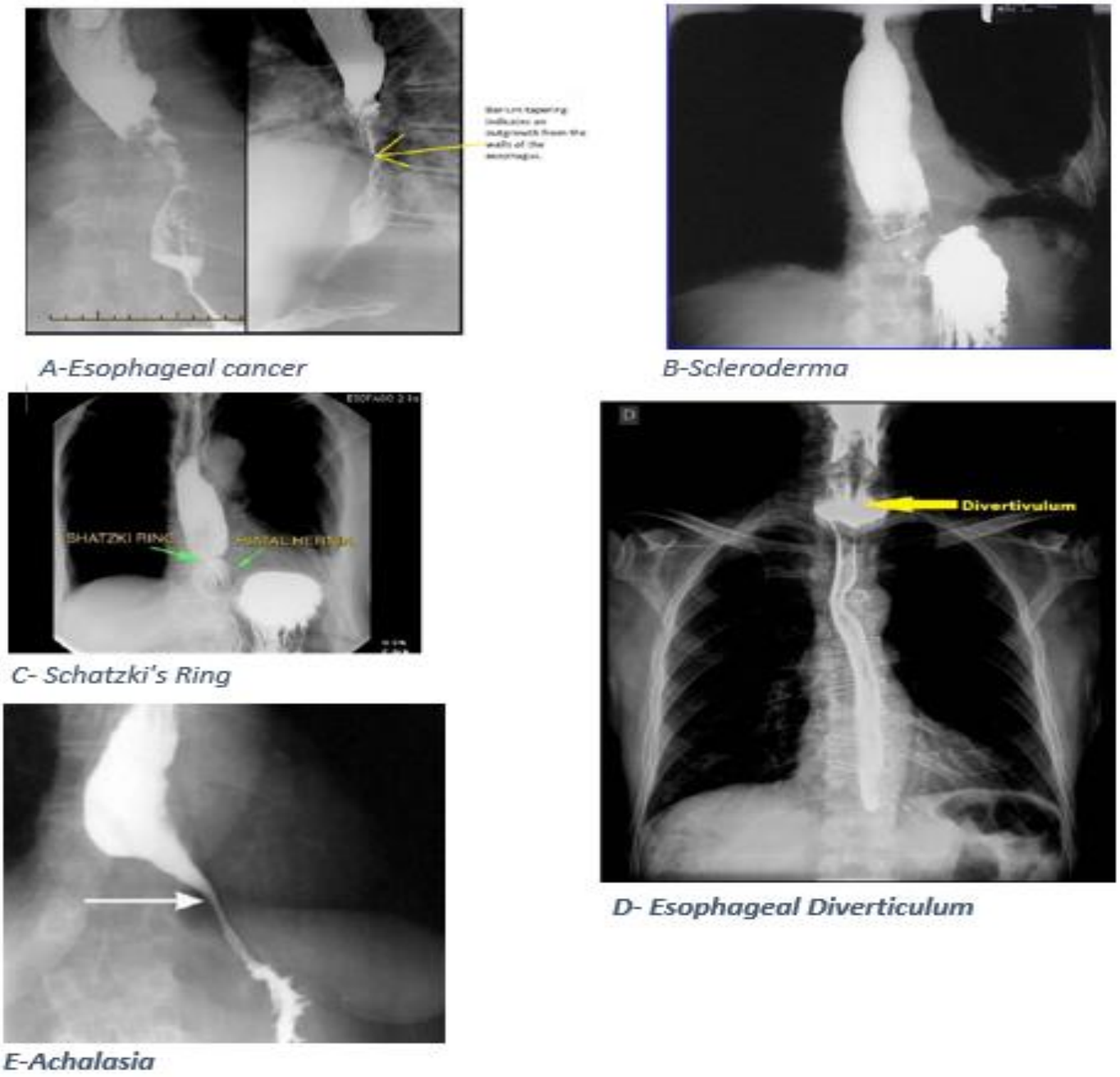

Figure 5. *Shows differential diagnosis of Plummer-Vinson Syndrome*
A-Esophageal cancer, B-Scleroderma, C-Schatzki's Ring, D- Esophageal Diverticulum, E-Achalasia

7 | RESULTS

Table .1: *Correlation of the Patients' Gender with Plummer Vinson Syndrome*

Gender of patient	No. of patients	Percentage
Male	10	20%
Female	40	80%

Table 2: *Correlation of the Patients' Age with Plummer Vinson Syndrome*

Age	No. of patients	Percentage
30 - 40 Y	10	20%
40 – 50 Y	30	60%
Above 50 Y	10	20%

Table 3: *Presentation of Plummer Vinson Syndrome Patients*

Presentation	No. of patients	Percentage
Dysphagia	50	100%
Significant Weight Loss	40	80%
Signs and Symptoms of Iron Deficiency	50	100%
Koilonychia	10	20%
Malignancy	0	0%

Table 4: *Associated Conditions and Disorders with Plummer Vinson Syndrome Patients*

Associated condition	No. of Patients	Percentage
Rheumatoid arthritis	5	10%
Thyroid disease	10	20%
Malnutrition & vitamin B deficiency	40	80%
Crohn's disease	1	2%

Table 5: *Investigations done for Plummer Vinson Syndrome Patients*

Investigations	No. of Patients	Percentage
Routine Blood Tests	50	100%
Barium Swallow	50	100%
Ct-Scan	20	40%

Table 6: Treatment of Plummer Vinson Syndrome Patients

Treatment	No. of Patients	Percentage
Mechanical Dilatation	45	90%
Correction of iron deficiency anemia	5	10%

Table.7 Complications due to treatment by Mechanical Dilatation for Plummer Vinson Syndrome Patients

Complication	No. of Patients	Percentage
Bleeding	50	100%
Delayed recovery from general anesthesia	3	6%
Sinus tachycardia	5	10%
Rapid atrial fibrillation	2	4%
Perforation	Nil	Nil
Mortality	Nil	Nil

8 | DISCUSSION

Plummer Vinson Syndrome is rare nowadays due to improved nutritional status. However, we encountered patients with Plummer Vinson Syndrome regularly in our city. Data regarding Plummer Vinson Syndrome are limited; hence, we aimed to study the clinical features, treatment outcomes, and development of complications in patients with Plummer Vinson Syndrome. Our study is a retrospective study of fifty patients for whom management was applied over a period of about nine years (2013 - 2022). This goes with the study made by Patil M, Malipatel and colleaques [15] which was conducted over a 10-year period (January 2008 to January 2018) in a medical college setting. All adults with dysphagia, iron deficiency anemia and post-cricoid web were included in the study. Patients were treated with iron supplementation and bougie dilation of the web. Patients were followed-up for the recurrence of dysphagia and development of complications. This also goes with the study made by Patil M, Malipatel and colleaques [15].

The number of patients in our study was 50 while 153 in the study made by Patil M, Malipatel and colleaques [15]. This is due to the fact that drainage of patients in our study depends mainly on outpatient clinic while the patients in the study made by Patil M, Malipatel and colleagues [15] depended on drainage of patient in a well-organized and equipped center. (80%) of our patients were females while males contributed only (20%). This is similar to the study made by Patil M, Malipatel and colleagues [15] in which (85.6%) of patients were women.

The ages affected ranged from 30 years to more than 50 years but most of the patient's age ranged from (40-50) years. This agrees with the study made by Patil M, Malipatel and colleagues [15] in which the mean age was 43.50 years (range 16-76).No malignancy was seen in our patients and this disagrees with the study made by Patil M, Malipatel and colleagues [15] in which four patients had concomitant squamous cell carcinoma of esophagus along with Plummer Vinson Syndrome and two developed upper gastrointestinal malignancy during follow-up. Regarding the presentation, 100% of the patients suffered from dysphagia associated with signs and symptoms of iron deficiency anemia and significant number of our patients (80%) had significant weight loss. This is similar to the study made by Patil M, Malipatel and colleaques [15] regarding the clinical picture in which the patient presents. No malignancy was found to be associated with Plummer-Vinson Syndrome at time of presentation but chronic illnesses like rheumatoid arthritis (10%), thyroid disease (20%) and rarely Crohn's disease (2%) was found as an associated disease. Malnutrition and vitamin B deficiency was a common associated condition and found in most patients. Routine blood investigations and barium swallow was done for all cases but Computerized Tomography was carried out for a certain percentage (20%) of patients.

All patients received management with good long term results and dilatation was the procedure of choice for 90% of patients while 10% of patients could be treated without need for dilatation by giving iron supplements and vitamins to the patient. Perioperative complications included bleeding, delayed recovery from anesthesia, sinus tachycardia & atrial fibrillation. No cases of perforation were recorded in our study and mortality rate was nil. This does not differ from the study made by Patil M, Malipatel and colleaques [15] in which similar complications could be recognized.

In the study made by Patil M, Malipatel and colleaques [15], all patients had been exposed to. Single session of Savary-Gilliard bougie dilation and was successful in majority of patients in relieving dysphagia while (90%) of our patients were exposed to dilatation and (10%) were treated iron and vitamins supplementation.

9 | CONCLUSION & RECOMMENDATIONS

1. Dysphagia associated with iron deficiency anemia may be part of a syndrome called Plummer-Vinson Syndrome (Patterson-Killy Syndrome).
2. Simple barium swallow is diagnostic for Plummer-Vinson Syndrome.
3. Most patients respond to simple mechanical dilatation which is usually carried out under general anaesthesia with minimal complication rate.
4. No significant morbidity rate was observed.
5. No mortality rate was observed.
6. Excellent results were found after dilatation of stenosed esophagus in Plummer-Vinson Syndrome.
7. Careful follow up after dilatation of stenosed esophagus in Plummer-Vinson Syndrome is mandatory to detect and treat complications as early as possible.
8. Bleeding after mechanical dilatation in Plummer-Vinson Syndrome patients was controllable and was expected to occur due to tear of the web during procedure of mechanical dilatation.
9. Searching for associated conditions and disorders with Plummer-Vinson Syndrome like rheumatoid arthritis, thyroid disease and rarely Crohn's disease is indicated.
10. Major intervention including resection of segment of esophagus containing the web

followed by end to end anastomosis or bowel interposition in cases of Plummer-Vinson Syndrome is contraindicated because of the excellent results obtained by simple mechanical dilatation.

11. Iron supplement and vitamins should always be offered to Plummer-Vinson Syndrome patients.
12. Follow up Plummer-Vinson Syndrome patients is important because it is a premalignant condition.

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