

# **I started coughing up blood-tinged sputum and noticed it coincides my menstrual cycles (Catamenial Hemoptysis). What is this all about?**

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Coughing up blood means the tissues involved are located somewhere between the trachea (windpipe) which separates into two large airways (bronchi), or the progressively smaller airways (bronchioles) to the ends where groups of air-exchange sacs (alveoli) exist. The lungs are composed of these airways and the lung tissue (parenchyma). Most often hemoptysis does not result in the sensation of 'pain' but has been reported in up to 7%<sup>1</sup>. For most who experience Catamenial Hemoptysis (CH), coughing is present in 54% and shortness of breath or dyspnea in 7%.<sup>1</sup> The average age of presentation is around 25.9 yrs +/- 4.6 yrs., and comprises an estimated 7%<sup>2</sup> to 14%<sup>1</sup> of those with 'Thoracic Endometriosis Syndrome' compared to 72-73%<sup>3-5</sup> who develop Catamenial Pneumothoraces (CP). Those with CP present an average of 5 yrs later around 30yrs.

There are a few differential diagnoses that your medical provider will need to consider. During the process, you may or may not, have made the association with your menses or even been diagnosed with Endometriosis prior to this point.

Although it may come unexpected, being able to capture a sample of your sputum during these times, refrigerate, contact your healthcare provider and request a lab analysis of your sample may help speed up the differential diagnosis.

Noting any of the following may also be helpful:

1.) Symptoms: chills, fever, fatigue, joint pain, weight loss. Do you experience shortness of breath or difficulty breathing. Do these symptoms and any cough occur that is a specific duration or isolated only to those days you have hemoptysis?

How many days do you have a productive cough that contains blood in it?

2.) Does this (and any other symptoms) always correspond with your menstrual cycles? How many times a day? How many days each cycle? How much sputum does each episode bring (teaspoon (5ml) tablespoon (12.5ml). Has the amount

remained consistent or increased over the number of months/episodes? Do these episodes occur every month or do you have months where hemoptysis or any other symptoms occur?

3.) If you have not been diagnosed with endometriosis, do you experience other cyclical symptoms that may indicate endometriosis elsewhere? Are these symptoms exacerbated around your menses: altered bowel habits (diarrhea, constipation), pain with bowel movements, altered bladder habits, pain with voiding, pain with intimacy, nausea and bloating, episodic low back, abdominal, hip, pelvic or leg pain?

Your healthcare provider may not be familiar with 'Catamenial Hemoptysis'. There are many differential diagnostics that must be considered. Some, but not all include: Infections (ie. Tuberculosis), Bronchitis, Bronchiectasis, Pneumonia, Abscesses, Pulmonary Emboli, foreign body present, Lung Cancer and Arterial-Venous Malformations. Some of these are quickly ruled out based upon age, absence of other signs (fever, chills weight loss, fatigue) and your history.

If other etiologies (reasons for your symptoms) have been ruled out and its cyclical nature, concurrent to menses, Pulmonary Endometriosis may be the working clinical diagnosis, how can it be detected and treated?

A recent case study by Huang H et al,<sup>6</sup> "Endometriosis of the lung: report of a case and literature review" reports:

A 29 yo female presented with catamenial hemoptysis one year duration. Initial estimates 5-10ml (1-2 tsp) each menstrual cycle. These episodes would begin 1-2nd day of menses, occur daily as blood-tinged sputum. Episodes ceased with the end of cycle (avg. day 6). During this time frame, the initial medical diagnosis was Tuberculosis. Treatment with anti-TB medications were given for 4 months. Treatment was discontinued when hemoptysis returned. Over the next months, hemoptysis volumes increased from the original 5-10ml (1-2 tsp) to 10-20ml (2-4 tsp) with heavier menstrual flows and increased dyspnea (difficulty breathing).

Her medical history was remarkable for 5 pregnancies (1 vaginal delivery 1 C-sections, 3 abortions). (a history of pregnancies, particularly uterine procedures is common, but not always, in woman's history that presents with catamenial hemoptysis)

Chest X-Ray: Irregular Nodular Opacity – middle exterior left lung. (The study does not clarify if the x-ray was taken while the patient was symptomatic).

Chest CT: Imaging suggestive of ‘pneumonia in the left superior lobe of the lung’ (completed during menstrual cycle immediately following an episode of hemoptysis).

Bronchoscopy: (On day 4 of Menses). ‘Active bleeding distal bronchus of the left lingular lobe’s superior segment’. Bronchiole Washing was performed to assess for infection (negative).

This case, due to lack of funding by the patient, was unable to undergo a VATS (smaller incision sites, less invasive procedure). Hence, for this case, a thoracotomy (larger incision surgery) was completed. A resection of the superior lobe (16.0 cm x 9.0 cm x 4.0 cm) was analyzed. Within the specimen, a 5cm x 4cm x 4cm dark red lesion was positioned 4 cm from a larger bronchus (airway). Under the microscope: presence of glands, epithelial and red blood cells, lymphocytes and phagocytes were observed in the alveolar areas (air exchange spaces). The tissue tested positive to hormones sensitivity (CD68+ and CK7+).

The primary investigators of this article also completed a database search of other case studies. The report 74 cases in publication since 1956. Of these, 37/74 involved the Right Lung; 19/74 Left Lung; 6/74 Both Lungs.

The co-existence of pelvic endometriosis was limited to 9/70 cases (12.8%) (however we must consider this may be lower than actual as imaging and awareness of different presentations and locations of the disease has advanced and the surgeons have various experience with the disease). 58/74 (78%) cases presented with a history of previous gynecological interventions/disorders (but these were not clarified). This case study was completed in Shanghai, China.

A second case by Celik A et al.<sup>7</sup>, “A Rare Case of Hemoptysis: Intrapulmonary Cavitory Lesion Appearing as a Thoracic Endometriosis” reports:

38 yo female c/o x 3-4 months hemoptysis concurrent with onset menses 3-4 days duration. All labs and physical exam normal. History of asthma x 4 yrs. CT exam ‘15x26 mm thick-walled cavitory lesion detected posterior segment R. lung lower lobe’. Bronchoscopy negative (article does not

clarify if assessment was completed during time of menses). Lesion was excised via VATS. This case report was conducted in Ankara, Turkey.

A third case reported by Singh K et al.<sup>8</sup>, “Catamenial Hemoptysis” reports:

29 yo female c/o 5 yr hx. recurrent hemoptysis. Failed diagnostic imaging with x 2 CT scans, bronchoscopies and a bronchogram performed outside the period of menses. However, CT imaging finally revealed positive findings when performed during menses. Imaging revealed ‘multiple cavitating lesions surrounded by ground glass opacities’. A VATS was performed with removal of ‘one of the cavitating lesions (which) showed ectopic endometrium’.

A fourth case, published back in 1997 by Orriols, R. et al,<sup>9</sup> “Chest CT Scanning: utility in lung endometriosis” reports:

29 yo female c/o hemoptysis, unknown duration but after an intra-uterine device was fitted for contraception. She was admitted for hemoptysis of 300cc (300mL/10 ou./1¼ cups). One prior successful pregnancy with delivery. All the following tests were negative at admission: chest x-ray, blood lab values, sputum analysis for bacteria and abnormal cells, scintigraphy for ventilation-perfusion ratios and lung arteriography.

NO CT Scans were performed during admission however, her hospital stay was concurrent with menses which led to Fiberbronchoscopy to determine origin of bleed. Orriols et al reports the procedure ‘showed active bronchial bleeding from right upper lobe.’ After menses ceased, Fiberbronchoscopy was performed one week later with negative findings. Patient was discharged. Episodic catamenial hemoptysis continued. Chest CT imaging was performed outpatient x 2 during separate menses. A 4 mm diameter cystic lesion was confirmed in the right upper lobe that was reduced to 1.5 mm diameter at 1 x inter menses CT scan. There was no reported interventions reported with exception to a subsequent pregnancy occurring (outcome unknown). Follow-up over three-year period reported no further hemoptysis. It is worth noting, the case presented here has a history of gynecological procedure and may, in fact, be one of the 58 of 72 cases reviewed by Huang et al noting this variable<sup>6</sup> which also supports theory of embolization. This study was completed in Barcelona, Spain.

In regards to imaging, there are limitations to sensitivity (how well the disease can be detected) and specificity (if lesions ARE detected, how likely it will BE endo and not something else). There are things that can improve detection: Attempts to perform imaging that can be performed during a symptomatic episode and a second image performed during a asymptomatic period. MRI and CT can both be used, MRI is more sensitive to soft tissue, doesn't expose you to radiation however it is significantly more expensive to perform. Celik A et al. discuss the limited value of plain chest x-ray films as they provide minimal to nil information on the parenchyma disease. However, x-rays are initial assessment testing and can reveal some abnormalities. Specific to computer tomography (CT), they state "besides infiltration appearance, pulmonary endometriosis foci may have an aspect of ground-glass opacities, well-contoured nodular lesion<sup>7,8</sup> and rarely cavitory lesions and bullous formations<sup>8</sup>. Celik A et al also state "aspects of the lesion, and diameter and feature of the lesions, may vary on computed tomography, especially during the menstruation period. Even there may be a parenchymal aspect between the menstruation periods." Hence, a radiologist or physician familiar with Pulmonary Endometriosis is the best to read these images. The appearance and regression of abnormalities on the images are highly specific for Pulmonary Endometriosis. However, a negative imaging study does not rule out its presence. There is an innate limitation to the sensitivity (how WELL the machine can detect the presence of disease).

With regards to bronchoscopy (using a lighted tube with a camera) to view the inside of the airway, viewers are able to detect reddened areas with increased vascularity and perform 'washings' in which tissue sampling can be collected and analyzed. Celik A et al.<sup>7</sup>, give reference to Shiota Y et al "A case of parenchymal pulmonary endometriosis, diagnosed by cytological examination of bronchial washing", which states 'diagnosis should be obtained with bronchoscopy examination and brushing will be performed during hemoptysis attack.<sup>10</sup> However, they conclude this is of limited value (with distal parenchyma being more commonly involved.<sup>11</sup> however the trachea and larger bronchiole system still occur and should always be conducted to evaluate the tissue and localize source of bleeding). Following the bronchoscopy carried on in 21 patients considered having pulmonary endometriosis, Shiota Y et al endometrial cells were found in 4 patients (19%).<sup>10</sup>

Although successful identification of the source of bleeding remains variable, bronchoscopy should always be conducted. It is possible that detection accuracy

lies in the experience and skills of the surgeons performing the procedures and familiarity with the disease. According to Celik A et al, they suggest biopsy conduction immediately before onset of menses.<sup>8</sup> While other authors recommend bronchoscopy during the menses.

Now comes the biggest question: WHO can help me? Sadly, this subtype of Endometriosis is still undertreated. Many traditional doctors do utilize medical therapies with various levels of success. However, these treatments often have significant side effects and the disease resumes after discontinuation (some interventions have a lifetime limitation in their use and thus only provide a temporary hiatus). There are some endometriosis excision surgery centers that offer a Gynecologist trained in identification of all forms and excise all lesions of the disease who works alongside a (Cardio) Thoracic surgeon. These teams have a solid working knowledge base of the various theoretical origins of Pulmonary Endometriosis (PE). You may have also heard the term 'Thoracic Endometriosis Syndrome' (TES). This is a more inclusive term which includes all the presentations of the disease in the chest region involving any of the following structures: lung parenchyma, visceral and parietal pleural linings, trachea and bronchiole airways, lymphatic and vascular structures, diaphragm, heart and cardiac sac. A person may experience one or more of these, which includes: Catamenial Hemoptysis, Catamenial Pneumothoraces, Catamenial Hemothorax, Catamenial Pneumomediastinum, Lung Nodules and Isolated Chest Pain).

TES is a frightening entity to experience. It is also difficult to obtain pathology results for CH with bronchoscopy samples 19%<sup>10</sup> but have been reported as high as 80% on excised parenchyma tissue when disease has been localized to areas identified on CT imaging containing 'ground glass opacities'.<sup>2</sup> Those who present with CP also have variable confirmation of histology which has been reported between 52% and 64.8 % in larger sample sizes.<sup>12,13</sup> More recent investigation into immunohistochemical analysis has revealed a greater understanding of tissues with suggestion that diagnosis should not require presence of both glands and stroma for confirmed diagnosis<sup>14</sup> and discuss presence of smooth muscle with suggestion of local tissue metaplasia. This concept is supported by a recent study with examination of post-mortem tissue samples from baboons with history of pulmonary endometriosis.<sup>15</sup>

The anxiety endured each month is often as difficult as the appearance of the symptoms. The disease can lead one to seek immediate care with hope to prevent a recurrence. Sadly, seeking swift resolution to avoid continued episodes, can

itself, cause problems if the surgical team is unfamiliar with the disease. Even the best intentions and procedures executed by a doctor who is not experienced with the disease, may perform procedures with incomplete assessment or interventions that later, when symptoms continue or recur, are much more difficult, often may require a more invasive surgical approach by a skilled team who treat TES to address residual disease.

It is important to note that surgeons with vast experience who can detect subtle signs of disease and treated a myriad of cases are far more apt to have successful outcomes and treat the disease comprehensively than a team of doctors who have never, or only completed a few cases. The disease can present in so many ways. Having a physician who has seen a vast array is most likely to aggressively search and remove any tissue which is questionable.

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