

# CATAMENIAL HEMOPTYSIS A CASE REPORT AND REVIEW OF THE LITERATURE



**Catamenial hemoptysis** is a syndrome characterized by bleeding from the tracheobronchial tree producing coughing of blood occurring periodically and synchronously in association with the female menstrual cycle. It is said to occur due to the presence of endometrial tissue in the lung that shows varying degree of cyclical response of the female sex hormones similar to the uterine endometrium. The diagnosis is usually based on clinical history and the exclusion of other causes of recurrent hemoptysis.

**Endometriosis** is defined as the occurrence of ectopic endometrial tissue outside the true cavity of the uterus affecting about 10-15% of women of reproductive age<sup>1</sup>. The pathologic findings usually are limited to the pelvis but can be found anywhere including the thoracic cavity. When endometriosis is present in the thorax it is termed as Thoracic Endometriosis Syndrome.

**Thoracic Endometriosis Syndrome** was coined by Joseph and Sahn after reviewing the medical literature for cases involving menstruation and pulmonary pathology<sup>2</sup>. It is classified into pleural (83%) and

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parenchymal (17%) types<sup>3</sup>. The pleural type is more common presenting as chest pain and dyspnea and may be associated with catamenial pneumothorax, catamenial hemothorax, hemopneumothorax or pleural effusion. Catamenial hemoptysis is one of the syndromes included in the thoracic endometriosis syndrome of the pleural variety. Other syndromes being catamenial chest pain, catamenial pneumomediastinum and pulmonary nodules<sup>4</sup>.

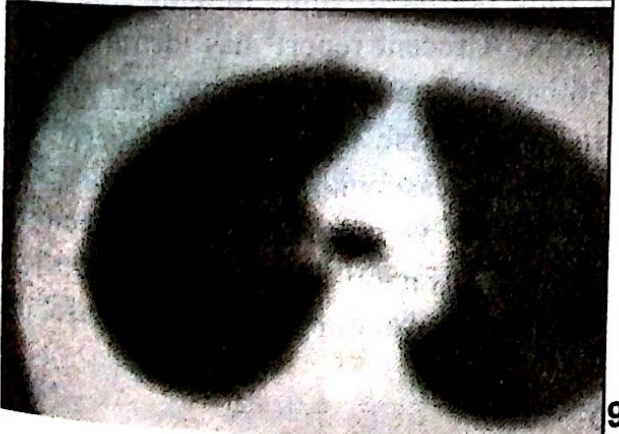
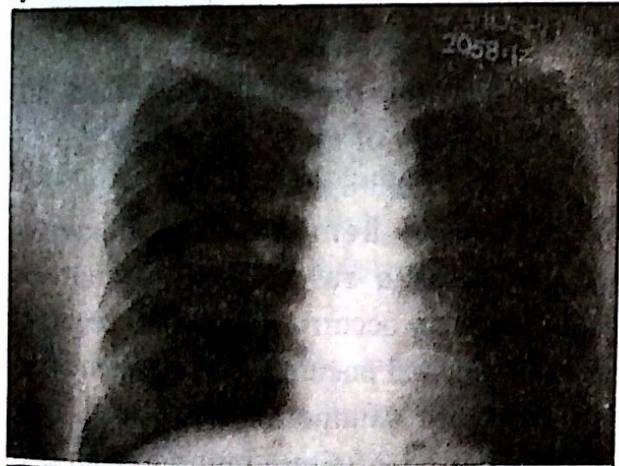
*This is a case report of a 26 year-old Nepalese woman, hailing from the terai region, who was referred to the Chest Department from Gynecology OPD as a case of hemoptysis on 2059.1.9 B.S. On detailed history the patient disclosed that her symptoms were recurrent coinciding with her menstrual periods since the last 3 months. The patient coughed up about 10-20ml of fresh red blood beginning on the first day of her menses. The quantity of fresh blood expectorated gradually decreased and the hemoptysis ceased at the end of her menses lasting about 5-6 days. She also had pain in lower abdomen not associated with per vaginal discharge, that had gradually become more severe at each of her past menstrual cycles. The time she presented herself on the first day of cycle with hemoptysis of about 200ml of fresh blood and the pain abdomen was the severest of all, during the present episode. She had no constitutional symptoms. The hemoptysis was 300ml on the fifth day but it gradually subsided by the ninth day. On the seventh day developed engorgement of both breasts*

galactorrhea.

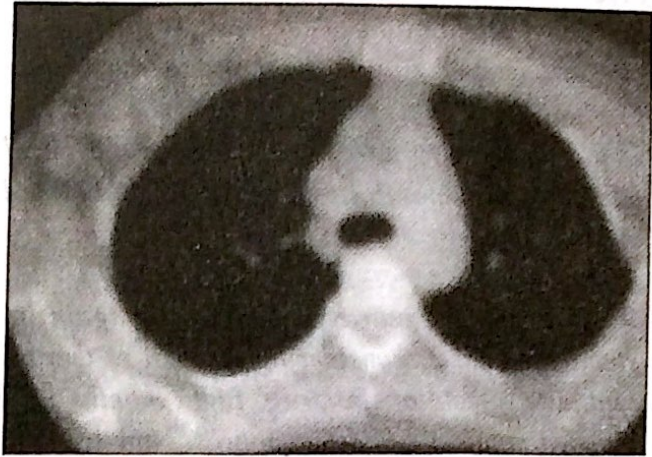
This patient was gravida-2, para-1 with the history of undergoing a dilatation and curettage two years back for an unwanted pregnancy of two months of gestation. She did not want to produce any more children. Her first child was a healthy four year-old male, born normally at home. She did not have any significant past history of illness.

Clinical examination did not reveal any abnormality except for some cervical erosion detected during the gynecology consultation.

Investigations showed anemia, bleeding and clotting profile were normal, collagen profile was negative, serum prolactin was within the normal range, PAP smear from cervical scrapings was negative for malignancy, x-ray chest did not show any abnormality and there was no sign of endometriosis or ovarian pathology on ultrasonologic examination of the abdomen. Bronchoscopy, done on the third day of her periods, showed blood coming out from apicoposterior segment of the left upper lobe bronchus, however no intrabronchial evidence of endometriosis was detected.



Diagnosed presumptively as a case of **Catamenial Hemoptysis** she was followed up with conservative treatment till the next menstrual cycle. Breast engorgement, galactorrhea and pain lower abdomen persisted. Hemoptysis was minimal this episode, occurring on the second day of menstruation. A CT scan of the thorax showed a ground glass type opacity conforming to the apicoposterior segment of the left upper lobe. A repeat CT done after 15 days failed to demonstrate the opacity during the intermenstrual period.



In consultation with the gynecologist we decided to put her on Medroxyprogesterone, a synthetic progestogen, 10mg BID. After about 15 days of therapy the patient felt better, breast engorgement gradually subsided, pain abdomen ceased to exist and the hemoptysis did not occur the next month, as she did not menstruate.

She took medroxyprogesterone for six months at home, a remote area of Nepal, during which she was asymptomatic. She stopped therapy after that when hemoptysis recurred along with severe abdominal pain and excessive bleeding per vaginum. She was taken to a nearby medical college hospital in a state of shock where blood transfusion was given and a total hysterectomy was performed – the indication of the procedure was not clear in the hospital documents that she brought later to us. Possibly the gynecologist at the hospital was not aware about the patient's condition of catamenial hemoptysis otherwise she would have offered total hysterectomy with salpingo-oophorectomy; if hysterectomy was to

be considered at all, saving the patient of further episodes of cyclical hemoptysis in the future. However, with the surgery, her pain abdomen completely resolved and the patient was very happy that she had got rid of her problem. She never knew what was coming next.

Next month the patient came back to us again with hemoptysis. Only symptomatic therapy was given this time and she was followed up at Chest OPD till the next month when hemoptysis recurred again, cyclically. Her condition was clear – because of her ovaries the cyclical hormonal stimulation of the endometrial tissue present in her lungs responded cyclically producing hemoptysis every month – and she would continue to have hemoptysis, in a cyclical manner every month, probably till she attained menopause.

We offered her medroxyprogesterone again instead of danazol, considering the cost of therapy and side effects of the drug. Eight months have elapsed since she had hemoptysis. Now we have three options for further management of this unfortunate patient:

1. Try to stop medroxyprogesterone and hope that the pulmonar endometriosis has regressed preventing the patient to have any further episodes of hemoptysis.
2. Offer her bilateral oophorectomy that will lead to the regression of the pulmonary endometriosis and the hemoptysis would stop. However, the patient would have to take hormone replacement therapy for a prolonged period with all its untoward effects.
3. Offer her surgical resection of the apicoposterior segment of the left upper lobe and get away with HRT.

Various hypotheses have been attributed to the aetiology of thoracic endometriosis. Of them the diaphragmatic lesion theory, the metaplasia theory, and the blood metastasis theory are generally advocated<sup>5,6</sup>.

**1. Transplantation Theory:** This theory states that sometimes there is retrograde menstruation with transdiaphragmatic passage and subsequent implantation of endometrium onto the diaphragm or into the thoracic cavity.

**2. Metaplasia Theory:** Since the structures in the thorax arise from mesothelium, sometimes metaplastic change may occur in the embryonic cell rests of the embryonic mesothelium. Embryologically the Mullerian ducts arise from these same tissues.

**3. Metastatic theory:** Parenchymal endometriosis is thought to be the result of the filter function of the pulmonary vascular network with trapping of the endometrial particles released directly into the blood stream during menstruation or manipulation of the uterus, a process similar to pulmonary embolism<sup>7</sup>. This theory of hematogenous dissemination is also supported by Casper *et al*<sup>8</sup> who found endovascular endometrial epithelium in the lungs histopathologically. Hemoptysis results from rupture of capillaries within the lesion due to fluid release during the time of menstruation.

**Catamenial hemoptysis:** Diagnostically it is a rare result of thoracic endometriosis occurring less frequently than catamenial pneumothorax. Patients present with catamenial hemoptysis after a long period of time, ranging from 1 to 10 years. A recent report<sup>9</sup> has identified 36 cases of catamenial hemoptysis reported in the English literature, since the first published case with successful treatment in 1956<sup>10</sup>. It is seen to occur in young non-multifarious women<sup>11</sup>. Hemoptysis classically occurs with the onset of

menstruation and ceases by the end. Most cases are attributed to pulmonary endometriosis, however, only about one-third of them are diagnosed histologically, post-operatively<sup>12</sup>. Endobronchial endometriosis has also been reported<sup>11,13</sup>.

**Catamenial pneumothorax** is a rare phenomenon classically seen mainly in multiparous women in their 3<sup>rd</sup> or 4<sup>th</sup> decade of life, occurring recurrently within 48-72 hours of menstruation, generally having a small sized pneumothorax, usually on the right (in 95% of cases)<sup>2</sup>. About 5% of women under 50 presenting with primary pneumothorax have catamenial pneumothorax<sup>14</sup>. Prevention of recurrence of this condition is difficult, as the recurrence rate is high, treatment duration is long and residual chest pain during menstruation is sometimes present. Aetiopathogenesis of this condition is not known, though many hypotheses have been proposed, for e.g.

1. Air passage from genital tract through congenital or acquired (diaphragmatic endometriosis) defects usually in the central tendon of the diaphragm.
2. Spontaneous rupture of blebs.
3. Prostaglandin induced bronchiolar constriction resulting in alveolar rupture.
4. Sloughing of endometrial implants involving the visceral pleura with subsequent pulmonary air leak<sup>2,15</sup>.

Catamenial pneumothorax was initially reported by Maurer in 1958<sup>16</sup>. About 100 cases have been reported in a recent review of the literature<sup>17</sup>. Less than one-third of patients having catamenial pneumothorax have pelvic endometriosis and about 11% have

history of previous surgery or uterine manipulation<sup>2</sup>. However only one-third of them have diaphragmatic implants at the time of thoracotomy. There is also a case report of spontaneous recurrent pneumothorax heralding menarche in a 15 year old adolescent girl<sup>18</sup>. Thus catamenial pneumothorax occurs solely in menstruating females and a high index of suspicion should be kept in all cases for proper management strategies.

**Catamenial Hemothorax** is an unusual cause of hemothorax usually involving the right hemithorax and diaphragmatic fenestrations with communications of pleural and peritoneal fluid have been documented in some cases<sup>19</sup>. Most patients have endometriosis of the pleura and associated pelvic and abdominal endometriosis. Sometimes the hemothorax may occur bilaterally, simultaneously along with hemo-pneumothorax<sup>20</sup>.

**Other syndromes:** Catamenial Pneumomediastinum, catamenial chest pain and catamenial lung nodules are the other syndromes also described in the thoracic endometriosis syndrome<sup>4</sup>.

#### INVESTIGATIONS:

1. Blood counts can be used to document the degree of anemia and infection. A bleeding and clotting profile is a must in every case.
2. X-ray chest PA film may show pulmonary opacity that may disappear after cessation of menstruation<sup>21</sup> e.g. nodules, consolidation etc. However in most cases of catamenial hemoptysis no radiological opacity is seen<sup>7</sup>. Pneumothorax, pneumomedi-

astinum, emphysema, pleural effusion e.g. hydrothorax, hemothorax may be seen in other forms of catamenial syndromes. Sometimes pulmonary and diaphragmatic blebs may be observed as a result of the presence of a perforated diaphragm, diaphragmatic endometriosis containing air filled tiny cavities in the thickness of the diaphragm or passage of an air bubble from the peritoneum directly to the chest cavity<sup>15</sup>. Such cavities could rupture and produce pneumothorax at the time of menstruation.

3. X-ray Abdomen could reveal air under the diaphragm.
4. Ultrasound examination of the abdomen may show pelvic endometriosis.
5. Pleural fluid cytology may show cells of endometrial origin<sup>22</sup>.
6. Bronchoscopy is a good diagnostic tool in some of the individuals with parenchymal or endobronchial endometriosis. Multiple bluish or purplish-red sub-mucosal patches can be directly visualized bilaterally, that bleed with touch when bronchoscopy is done within one or two days of menstruation<sup>11</sup>. These lesions show waxing and waning with the phase of menstruation. Blood can be directly visualized coming out of a bronchus, and in the absence of positive findings on conventional radiology or MRI/CT scans, segmental localization of the lesion thus, may be achieved<sup>4</sup>. Bronchial brush cytology may demonstrate cells of endometrial origin<sup>11</sup>. Transbronchial lung biopsy

showed macrophages with phagocytosed hemosiderin in one case<sup>21</sup>. In most of the cases, however bronchoscopy may be normal<sup>23</sup>.

7. MRI has been reported to be a useful tool in the diagnostic workup for pelvic endometriosis<sup>7,24</sup>. MRI has the same accuracy as CT for detection of chest lesions. It may be superior in the aspect of detecting a parenchymal from a pleural lesion. Typical findings of MRI are a hyperintense lesion on T2-weighted images that show waxing and waning with the phase of menstruation and taking up more intravenous contrast as compared with that in the intermenstrual period<sup>7</sup>.
8. CT Scan Thorax, like MRI, is useful to detect and localize waxing and waning parenchymal lesions with the phase of menstruation. This diagnostic modality can reveal lesions even if they are not visualized on plain X-ray chest<sup>8,23</sup>.
9. Serum CA 125 is increased in endometriosis and ovarian pathology. Raised levels of serum CA 125 returning to normal after resection of the involved tissue has been reported<sup>25</sup>.
10. Pulmonary angiography has little value in detection of pulmonary endometriosis<sup>26</sup>.
11. Thoracoscopically (VATS) the lesions appear as several violet, purplish-red, cherry-red or blueberry implants seen over the diaphragm usually in the central tendon or over the visceral pleura. Pinhole sized diaphragmatic fenestrations and bubbles may also be visualized. VATS represents the surgical approach of choice for spontaneous pneumothorax by which

complete exploration of the thoracic cavity can be done, including the diaphragm<sup>15</sup>.

12. Laparoscopy may be performed for visualization of pelvic endometriosis<sup>21</sup>. Pelvic endometriosis is associated with catamenial pneumothorax in less than one third of the cases<sup>2</sup>.
13. Immunohistochemical staining of resected specimens may show antibodies to CA 125 in the cells of endometrial origin<sup>27</sup>.

## TREATMENT

1. **Medical therapy** for the treatment of thoracic endometriosis syndrome is similar to the drugs (hormones) used for pelvic endometriosis. Although, surgery provides better results, the inhibition of sex hormones is still considered of paramount importance in the treatment of endometriosis<sup>2</sup>. However, treatment failures are reported after cessation of therapy in up to 40% cases, requiring surgery later<sup>2</sup>. A combination of video assisted thoracic surgery with medical therapy is probably the optimal treatment modality for these kinds of patients<sup>15</sup>. Because of the anecdotal nature of the disease, there are no large series to study in which to base therapy on.

In addition to recurrence, hormonal therapy has many side effects that can make it unattractive for the women in childbearing age precluding pregnancy and childbirth. Other problems are weight gain, regression of secondary sexual characteristics

and change in the body habitus<sup>4</sup>.

The drugs used are:

**a. Oral contraceptives** used in an intermittent or continuous manner may alleviate the disease. After two months of oral contraceptive given to a 32 year-old woman for the presumptive diagnosis of catamenial hemoptysis, Fleischman found no recurrence of hemoptysis during an 18-month follow-up period<sup>28</sup>. There is an increased risk of thromboembolism in this group of patients.

**b. Oral Progestogens** exert an anti-estrogenic effect preventing endometrial shedding and in 6-9 months produces a state of pseudo-pregnancy ultimately causing regression of the disease. These may cause weight gain and irregular bleeding.

- i. Norethisterone 5-20 mg daily.
- ii. Dydrogesterone 10-30 mg daily.
- iii. Medroxyprogesterone acetate 100 smg I/M 2-4 weekly.

**c. Danazol** (200-800 mg daily for 3-6 months) is a semi-synthetic derivative of ethyl testosterone that inhibits pituitary gonadotrophins causing a state of pseudo-menopause. The first report of treatment of catamenial hemoptysis with hormones was by Ronberg<sup>29</sup>. Since then danazol has been used successfully for the treatment of catamenial hemoptysis.

The resulting amenorrhoea corrects itself after cessation of therapy. Danazol therapy is very effective but

is expensive and causes other side effects like weight gain, hirsutism, excessive sweating, depression, breast atrophy and atrophic vaginitis. About 80% implants regress with danazol. The chances of successful pregnancy following this therapy are 30-50%.

**d. Gonadotrophic releasing hormone (GnRH)** or its synthetic analogues can suppress pituitary gonadotrophins causing atrophy of the endometrial tissue. There are many case reports of successful therapy with GnRH agonists<sup>22,23</sup>. The dose is 10-20 µgm i/v BD, 200-400 µgm intranasally OD for 6 months. The dose depends on the type of GnRH agonist used.

**e. Surgical Therapy** is offered to patients who have localized lesions or do not show adequate response to medical therapy or there is a high chance of recurrence. Generally thoracoscopy (VATS) or thoracotomy is offered to these patients. Surgery also avoids other unwanted hormonal side effects.

Histopathological examination of the resected specimen does not always reveal endometrial tissue. Some very unusual diagnosis has been discovered in the resected specimen, for e.g. A-V malformation, micrometastasis from thyroid cancer, hemosiderosis, granulomatous phlebitis, lung cancer and bullous disease.

For parenchymal endometriosis presenting as catamenial hemoptysis

the surgical procedure of choice is VATS, which can be used to visualize all the pleural surfaces. The lesions are identified and a lung sparing surgery e.g. partial segmentectomy, segmentectomy or lobectomy is performed.

For pleural endometriosis, VATS again is the procedure of choice to resect the involved portion of diaphragm, sealing of the diaphragmatic defects, pleurodesis in recurrent pneumothorax and hemothorax. Sometimes these procedures are not possible with VATS, then a minithoracotomy or an extended thoracotomy and exploration is done.

Surgery is highly successful for parenchymal endometriosis when the disease is well localized and complete excision is possible, however recurrence rates are very high in cases of catamenial pneumothorax.

In patients who have pelvic endometriosis total abdominal hysterectomy and bilateral salpingo-oophorectomy can be done. The drawback of this procedure is that patients can bear children no more and they need to be on hormone replacement therapy for prolonged periods of time with all its harmful effects.

## CONCLUSION

Thoracic endometriosis syndromes are very rare. Diagnosis is of presumption – by the clinical presentation. Catamenial pneumothorax is more common as reported

in the literature, followed by catamenial hemoptysis. Physicians should be aware of this extremely rare phenomenon for proper planning of therapy. Due to the lack of a series of patients there are no definite guidelines for the management of this condition. We have to rely on individual case reports and anecdotal reports to base our therapy on. Medical therapy can be tried initially as there are many reports of success with this modality of treatment. However, patients need to be resorted to surgery if they have failure of medical therapy or develop side effects to the drugs. Video assisted thoracic surgery (VATS) is the modality to be offered first, at experienced centers.

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**Intern Joke Competition (Second Prize)**

After hearing that a patient in a mental hospital had saved another from suicide attempt by pulling him out of a bathtub, the hospital director summoned the rescuer to his office. "Looking through your file and taking into account your heroic behaviour, I'm confident that you are ready to be allowed home. I'm only sorry that the man you saved, later killed himself with a rope around his neck." "Oh! no!", said the rescuer. "He didn't kill himself. I hung him up to dry."

*Compiled by: Dr. Sanjeev Tiwari.*

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