HPI

- 27 yo male presented with epistaxis x3 day
  - Admission 1/24/2011

- Other associated symptoms
  - Generalized weakness
  - Anorexia
  - Weight loss (50 lbs in 2 weeks)
  - Night sweats
PAST HISTORY

- Incarcerated for 10 years - released recently
  - Health deteriorated after release
  - Esp. weakness and wt loss

- Spontaneous pneumothorax 1-2 months prior to current admission
  - Left thoracotomy with blebectomy
  - Uneventful recovery
PHYSICAL EXAM

VS
- 105/65
- 77/min
- 98F

General
- Cachectic

Abdominal exam
- Tender to deep palpation
- Hepatosplenomegaly
ADMISSION LABS

**CBC**
- WBC 4.6
- Hb/Ht 9.8/31

**LFTS**
- AST 59
- AP 606
- LDH 388
HEMATOLOGY

Working Diagnosis

Idiopathic Thrombocytopenic Purpura

IVIG 0.5 g/kg daily x 3 days
CT Scan Abdomen/pelvis
CT SCAN ABDOMEN AND PELVIS
CT SCAN ABDOMEN AND PELVIS
CT SCAN ABDOMEN AND PELVIS
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CT SCAN ABDOMEN AND PELVIS
CT SCAN ABDOMEN AND PELVIS

- Splenomegaly with diffuse heterogeneous enhancement and diffuse innumerable lesions
- Soft tissue fullness in the porta hepatis and splenic hilum- possibly LN
- Hepatomegaly
- Retroperitoneal LN

R/O LYMPHOMA
CT SCAN CHEST

- LLL 1.9 cm nodule with irregular margins
- Bilateral hilar LN
- Multiple enlarged mediastinal LN

R/O LYMPHOMA
PET CT
PET CT
## WORK UP/HOSPITAL COURSE

<table>
<thead>
<tr>
<th>Date (HD)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD1</td>
<td>PPD placed- negative IVIG started at 25g/day x3days</td>
</tr>
<tr>
<td>HD3</td>
<td>Evaluation by IR for possible CT-guided LN biopsy Bone marrow biopsy done- <strong>megakaryocytic hyperplasia</strong></td>
</tr>
<tr>
<td>HD4</td>
<td>IVIG day 3- no major improvement Decadron started at 40 mg PO daily</td>
</tr>
<tr>
<td>HD5</td>
<td><strong>PLATELETS &lt;5</strong> Platelet transfusion</td>
</tr>
<tr>
<td>HD6</td>
<td><strong>SURGERY CONSULT</strong> for evaluation for splenectomy</td>
</tr>
</tbody>
</table>
## WORK UP/HOSPITAL COURSE

| HD6-7 | Transferred to surgery/monitored setting  
6 units platelets since admission  
DDAVP |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HD7</td>
<td>Repeat CT A/P- evidence of gastric varices and portal HTN</td>
</tr>
</tbody>
</table>
| HD8   | **Splenectomy**  
- EBL 3000ml  
- 10 units PRBCs  
- 8 units single donor platelets  
- 2 units pooled donor platelets  
- 4 units FFP  
- 3000ml crystalloids |
OPERATIVE FINDINGS

- Large hepato-splenomegaly
- Well vascularized splenic ligaments
- Difficult dissection
- Intra-operative bleeding
- LUQ packing
- Abdomen kept open with VAC pack
- Transferred to ICU
PATHOLOGY

GRANULOMATOUS INFLAMMATION
PATHOLOGY

- CASEATING GRANULOMAS
- GIANT CELL
PATHOLOGY

SPLEEN

- Entire spleen replaced by caseating granulomas
- Wt 1430 grams
- 33x18x8cm
- Granulomatous inflammation, necrotizing type
- Mycobacterium tuberculosis bacteria present by AFB special stain
- Hilar lymph nodes with non caseating granulomas
# POST-OPERATIVE COURSE

<table>
<thead>
<tr>
<th>POD</th>
<th>Event Description</th>
</tr>
</thead>
</table>
| POD1 | Started on anti-tuberculous medications  
       AFB sputum negative x3 |
| POD2 | OR for wash-out  
       VAC pack reapplied |
| POD4 | OR for wash-out  
       Closure with JP drain next to tail of pancreas |
| POD5-8 | Failed multiple attempts at extubation  
       Started on tube feeds  
       Fevers |
| POD10-11 | Extubated  
       Tolerating diet |
## POST-OPERATIVE COURSE

| POD12 | Blood cultures- Candida albicans  
Started on Micafungin |
|-------|--------------------------------------------------------------------------------|
| POD13 | Still spiking despite ATT and Micafungin  
RUQ sono- no cholecystitis  
Repeat CT AP  
12 cm fluid collection in splenic lodge  
Small bilateral pleural effusions |
| POD14 | IR Drainage of collection  
Sero-sanguinuous- no improvement |
| POD15 & up | Patient still febrile, persistent fungemia, transferred out of ICU to the medical team  
Platelet count  870- ASA |
SPLENIC TUBERCULOSIS
HISTORICAL OVERVIEW

- **PRIMARY TUBERCULOSIS OF THE SPLEEN**
  - coined by Coley in 1846 [1]
    - Refers to an enlarged spleen from tuberculosis
    - No or little involvement of other organs

- **1938**- Englebreth-Holm changed it to **TUBERCULOUS SPLENOMEGALY** [1]
  - Thought that the term Primary Tb of the Spleen is misleading
  - Considered that tuberculosis of the spleen must always be secondary

Meredith HC et al
GENERALITIES

Extrapulmonary Tuberculosis

- 15-20% of all cases of Tb [2]

Abdominal Tuberculosis

- 3-11% of extrapulmonary Tb [2,3]
FORMS AND INCIDENCE

SPLENIC TB OCCURS IN 2 FORMS

- As part of MILIARY TB
  - Relatively common
  - Occurs in immunocompromized patients

Spleen is the third organ involved (Lungs 100%, Liver 82%, Spleen 75%, LN 55%, Bone marrow 41%) [4]

Imani Fooladi AA et al
FORMS AND INCIDENCE

- ISOLATED splenic tuberculosis
  Extremely rare

Only 6 cases reported from 1965-1992 in the French, English and German literature [4]

Less than 100 cases reported in China [5]

Imani Foolady AA et al.
Zhan et al.
PREDISPOSING FACTORS [2,4,6]

- Immunosuppression including AIDS
- Preceding pyogenic infections
- Splenic abnormalities
- Previous splenic trauma
- Sickle cell disease (and other hemopathies)
- Advanced age
- Diabetes
- Malnutrition
- In immunocompetent patients, there was usually another site affected by Tb.

Hamizah R et al; Imani Fooladi AA et al; Rhazal F et al.
# CLINICAL PRESENTATION

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>82.3%</td>
</tr>
<tr>
<td>Fatigue and failure to thrive/weight loss</td>
<td>44.12%</td>
</tr>
<tr>
<td>Splenomegaly</td>
<td>13.2-100%</td>
</tr>
<tr>
<td>Asymptomatic leading to a delay in diagnosis up to 3 months</td>
<td></td>
</tr>
</tbody>
</table>
CLINICAL PRESENTATION

Other presentations

- **Pain** - Uncommon [4]

- **Fulminant form** - rapid progression with fever, cachexia, hemorrhage and sepsis [6]

- **Splenic rupture** - rare [2]

- **Hypersplenism**

- **Portal Hypertension** - with or without GI bleeding [6]
CLINICAL PRESENTATION/
HEMATOLOGIC ABNORMALITIES

<table>
<thead>
<tr>
<th>TWO FORMS</th>
<th>CYTOPENIC</th>
<th>POLYCYTHEMIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most common</td>
<td>Erythroblastic</td>
</tr>
<tr>
<td>CYTOPENIC</td>
<td>Anemia- hemolytic, aplastic, megaloblastic…</td>
<td>Myelocytic</td>
</tr>
<tr>
<td></td>
<td>Leukopenia</td>
<td>Thrombocytic</td>
</tr>
<tr>
<td></td>
<td>Thrombocytopenic</td>
<td>R/O myeloproliferative disorder</td>
</tr>
<tr>
<td></td>
<td>Pancytopenic</td>
<td></td>
</tr>
</tbody>
</table>
DIAGNOSIS

- **PPD**
  Most of the time positive  
  Weak argument in endemic countries [8]

- **PCR** [4, 8]
  Can identify the organism up to the species  
  Serlogy or pathologic specimen  
  Sensitivity **53-93%**  
  Specificity **84-100%**

Berady S et al; Imani Fooladi AA et al.
**DIAGNOSIS**

**SONOGRAM**
- 5 pathomorphological types [5]
  - Miliary Tb
  - Nodular Tb
  - Tuberculous abscess
  - Calcific Tb
  - Mixed type Tb

- TUBERCULOMAS [6,9]
  - Multiple hypoechoic lesions, well demarcated w/o posterior enhancement
  - DD- Lymphoma, acute leukemia, angiomas, metastases, fungal infections

Zhan et al; Rhazal et al; Sharma et al.
DIAGNOSIS/SONOGRAM

TUBERCULOUS ABSCESS [6,9]

Hypoechoic or anechoic irregular lesions with posterior enhancement and sometimes containing debris
**DIAGNOSIS**

**CT SCAN** [6,9]
- **Tuberculomas**
  - Hypodense, homogeneous, non enhancing, sometimes with a vascularized rim

- **Sensitivity in splenic abscess** 90-100%

- **Differentiates MAC from M. tuberculosis (?)**

- **Homogenous splenomegaly**
DIAGNOSIS

FNAC

Should be considered in front of any splenomegaly associated with a fever of unknown origin [6]

Can involve the spleen, the liver or any accessible lymph node [5,6]

Can show granulomas with caseating necrosis [5,6]

Sensitivity 88%, specificity up to 100% [3,6]
DIAGNOSIS

LAPAROSCOPY \[5, 10\]

**Indications**
- Absence of interventional radiology capabilities
- Failure of less invasive methods in establishing a diagnosis

**Advantages**
- Avoids unnecessary splenectomy
- Provides direct hemostasis
- Accurate
Splenomegaly in a patient with suspected tuberculosis

Abdominal ultrasound

No danger of splenic rupture

- Splenic TB most likely, with minimal extrasplicenic involvement
  - Start/continue ATT

Spleenic TB still in question, or extensive intra-abdominal TB

- Abdominal CT

Concern for splenic rupture

- Surgery consult

- Splenic TB still in question
  - Fine needle aspiration, with or without CT guidance

Repeat U/S in 6 months-1 year to visualize resolution, or early if clinical deterioration

- Ultrasonographic and clinical resolution
  - May consider stopping ATT if resolution or only fibrous apparent

- Incomplete resolution
  - Abdominal CT

Lesion still ambiguous

- Where available, consider MRI or PET to evaluate for fibrous versus active lesion
TREATMENT

ANTI-TUBERCULOUS MEDICATIONS

- First line of treatment [2,5,6,7,8,11]
- Triple or quadruple therapy (INH, Rifampin, PZD…)
- Duration 12 months at least (up to 24 months in one study) [2,5,11]
- Good response 86.6% [7]

A sono or CT-guided percutaneous drainage of associated collections greater than 5 cm may be added to the ATT [6]
TREATMENT

SPLENECTOMY

- Not needed most of the time
- Still advocated by some authors to be an adjunct to ATT [8,12]

- DIAGNOSTIC [6]
  - Recommended in case of failure of other diagnostic methods

- THERAPEUTIC

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TREATMENT/SPLENECTOMY

**INDICATIONS** [2,6]

- Failure of medical treatment
- In case of Cytopenia or Polycythemia
- Tuberculous splenomegaly with GI bleeding due to PORTAL HTN
- Failure of percutaneous drainage of splenic abscess
- Multiple abscesses of the spleen
- PS- continue ATT after surgery
FOLLOW UP

- **MRI/PET**
  - If persistent lesions on US or CT scan
  - Better suited to resolve stable fibrotic lesions vs persistent active lesions
  - PET is especially suitable for detecting the activity of the lesions
  - Crucial in assessing when to terminate treatment [9]
CONCLUSION

- Splenic Tuberculosis is a rare affection
- Most commonly associated with immunocompromized states although it is also reported in immunocompetent patients
- Most of the time there is another focus
- Attempts at diagnosis should be done to avoid undue splenectomy
- First line therapy is medical
- Splenectomy reserved for diagnostic uncertainty and cases refractory to medical treatment as well as in very specific conditions
1- Meredith HC, Early JQ, Becker W. Tuberculous splenomegaly with the hypersplenism syndrome. *Blood* 1949; 4: 1367-73


REFERENCES


REFERENCES


