



Spontaneous Bacterial Peritonitis (SBP)

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Overview

- Definition
- Etiology
- Pathogenesis
- Diagnosis
- Treatment
- Follow up
- Summary

Peritoneal Infections

- Primary or Spontaneous
- Secondary (e.g., related to pathologic process in a visceral organ)
- Tertiary (e.g., persistent or recurrent infection after adequate initial therapy)

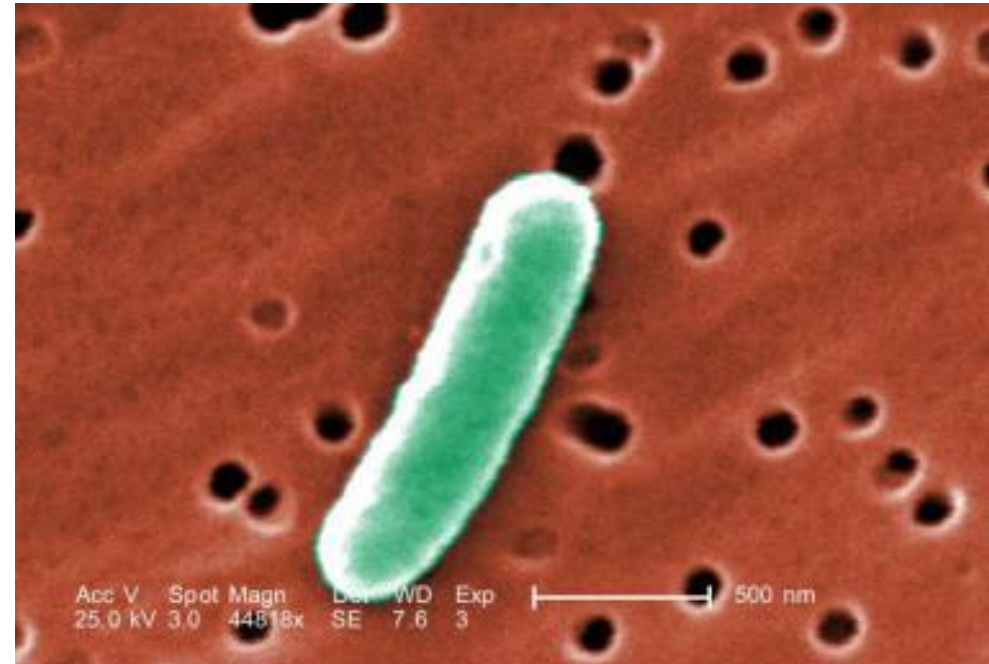
Definition

SBP is characterized by the spontaneous infection of ascitic fluid in the absence of an intraabdominal source of infection (e.g. intestinal perforation, abscess).

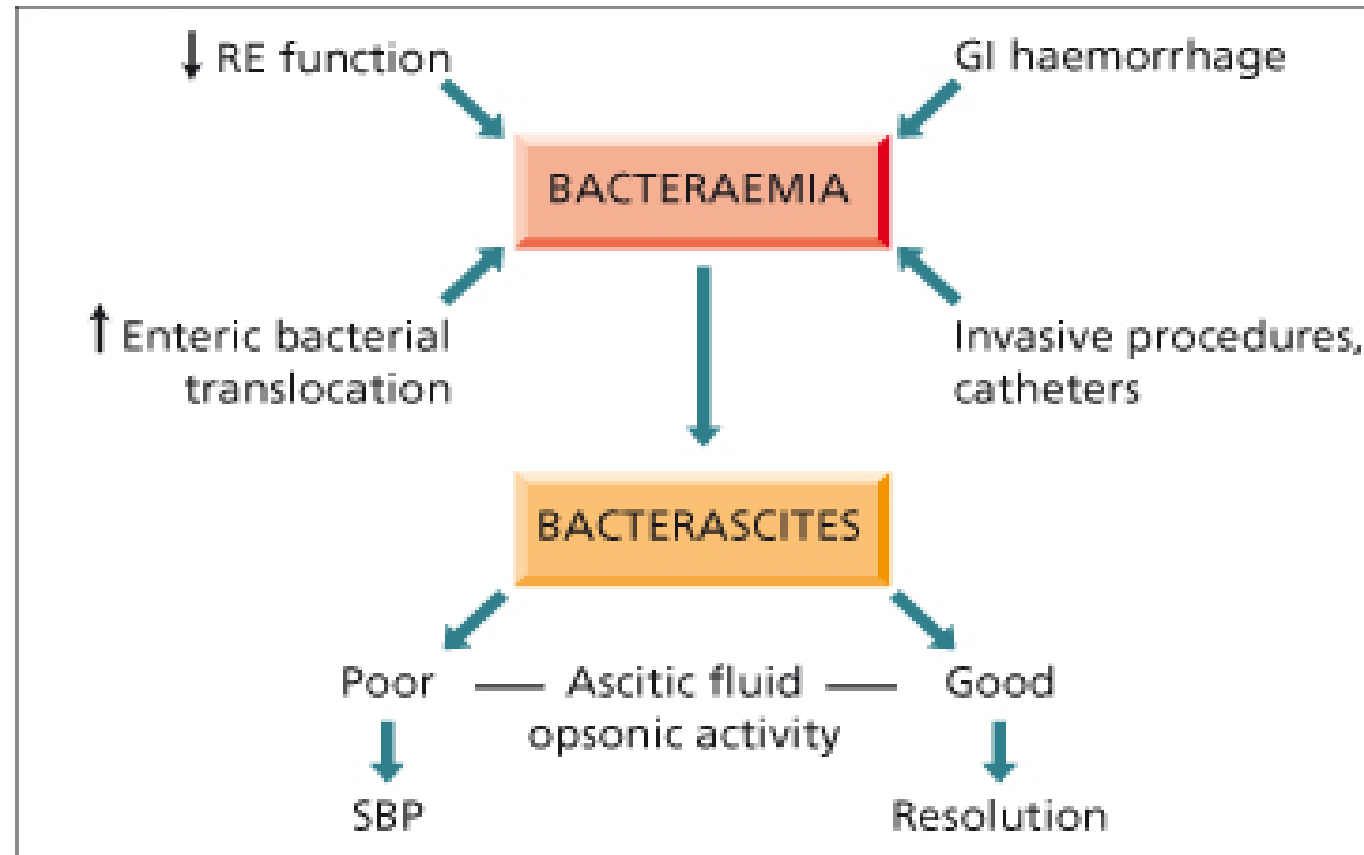
The most common is SBP with an incidence of approximately 10-30%.

Etiology

- Usually Monomicrobial (in 90% cases)
- Aerobic gram-negative organisms, mainly *E. coli* (70%).
- Gram-positive cocci, mainly *Streptococcus* (20%)
- *Enterococcus* accounting for 5% of the cases.



Pathogenesis



Diagnosis

- Early diagnosis and the initiation of prompt effective therapy have played key roles in decreasing the mortality associated with SBP.
- SBP should be suspected if a patient with known cirrhosis deteriorates.



Diagnosis

A diagnostic paracentesis should be performed –

- Any cirrhotic patient compatible with symptoms and/or signs of peritonitis
- Any cirrhotic patient with sudden unexplained deterioration in renal function or hepatic encephalopathy.

Diagnosis

The diagnosis of confirmed SBP requires-

Elevated ascitic fluid absolute polymorphonuclear leukocyte (PMN) count of at least 250 cells/mm³ (0.25×10^9 /L)

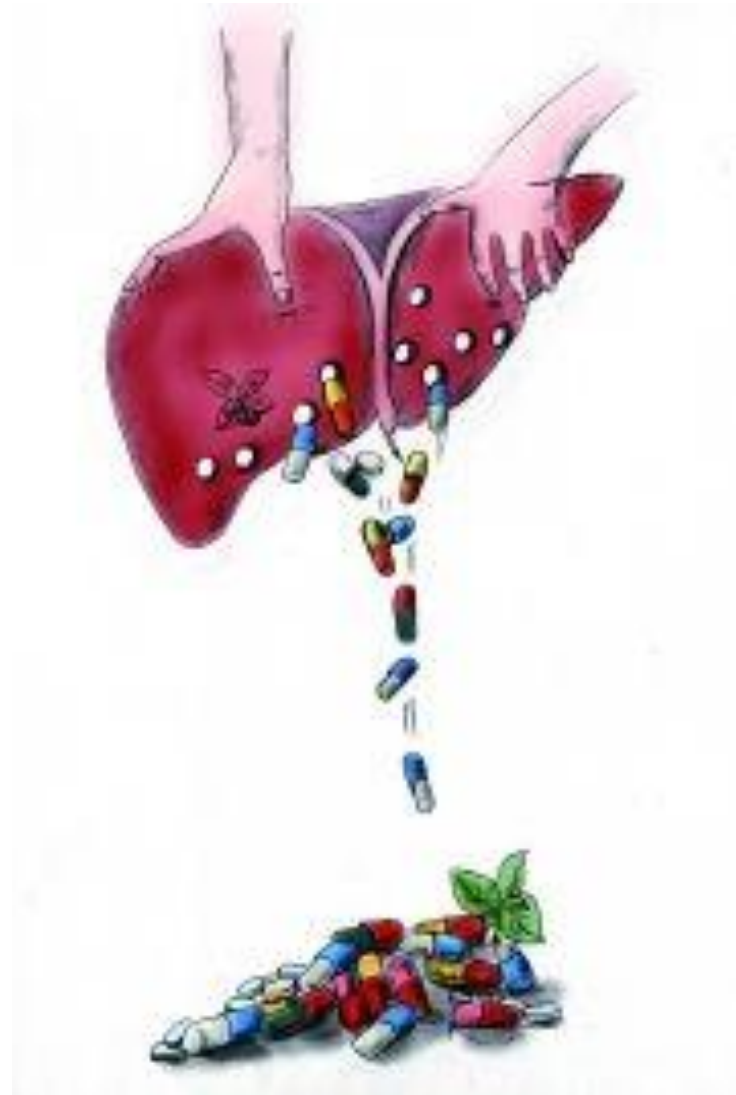
and

a positive ascitic fluid bacterial culture without an obvious intra-abdominal source of infection.

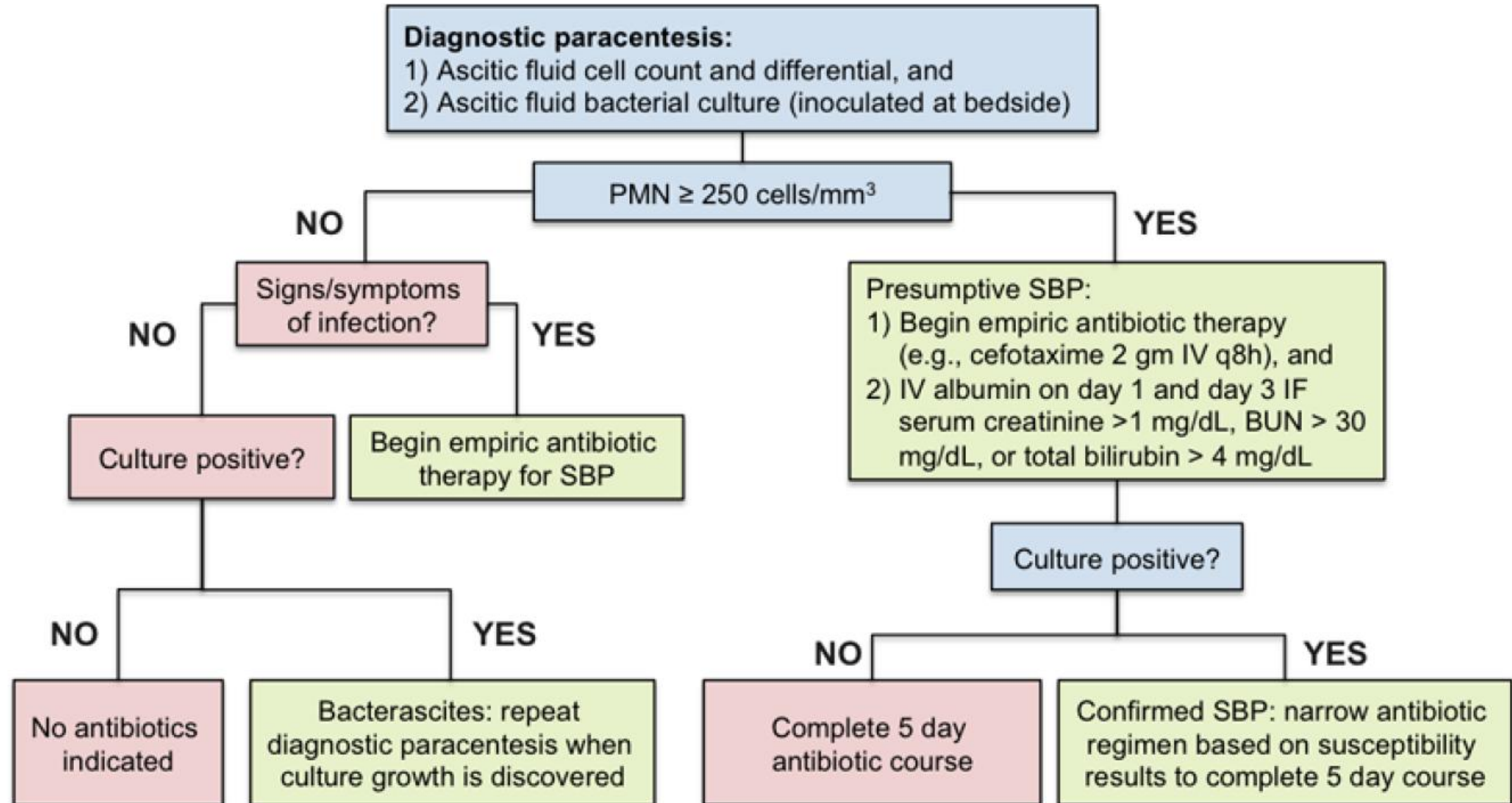
Diagnosis of Secondary SBP

- Ascitic Fluid Analysis
 - Absolute PMN count ≥ 250 cells/mm³
 - Multiple organisms on gram stain and culture
- Runyon's Criteria (at least 2 of the following findings)
 - Ascitic fluid protein >1 g/dl
 - Glucose <50 mg/dL (2.8 mmol/L)
 - LDH greater than the upper limit of normal for serum
 - Carcinoembryonic antigen >5 ng/mL or alkaline phosphatase >240 units/L

Treatment



Approach to the Diagnosis and Treatment of Spontaneous Bacterial Peritonitis



Treatment Regimens

- **Cefotaxime** administered 2 g IV every 8 hours is the mainstay of treatment.
- **Cefotaxime** has been shown to be successful in treating SBP in 77% to 98% of cases.

Treatment Regimens

- **Ceftriaxone** 1 g IV every 12 hours or 2 g every 24 hours for 5 days can be used in place of cefotaxime.
- **Oral ofloxacin** 400 mg PO twice a day for an average of 8 days is also effective.
- Extended spectrum antibiotics, such as carbapenems, may even be considered in nosocomial cases.

Adjunctive IV Albumin

The use of IV albumin (1.5 g/kg given within 6 hours of enrollment and repeated as a 1.0 g/kg dose on day 3) as an adjunctive to cefotaxime was shown to decrease in-hospital mortality when compared with use of cefotaxime alone



Adjunctive IV Albumin

Use of IV albumin should be reserved for patients with a serum creatinine greater than 1 mg/dL, blood urea nitrogen greater than 30 mg/dL, or total bilirubin greater than 4 mg/dL.

Follow-up Diagnostic Paracentesis

- Follow-up ascitic fluid analysis is not necessary following treatment of SBP, unless lack of clinical improvement.
- If the ascitic fluid PMN count has not declined by at least 25% after two days of antibiotic therapy, then the antibiotic coverage needs to be broadened and secondary bacterial peritonitis needs to be considered.

Follow-up Diagnostic Paracentesis

- Patients with **secondary bacterial peritonitis** should undergo surgical intervention of the perforated viscus or drainage of the abscess and should be treated with broad-spectrum antibiotics.

Indications for SBP Prophylaxis

- Due to risk of resistance and alteration of gut flora, long-term antibiotic prophylaxis should be reserved for high-risk patients only.
- Identified risk factors for the development of SBP include:
 - ✓ ascitic fluid total protein less than 1 g/dl,
 - ✓ gastrointestinal hemorrhage, and
 - ✓ a previous history of SBP.

Primary Prophylaxis of SBP

- The AASLD guidelines suggest using long-term antibiotic prophylaxis in patients who have ascitic fluid total protein less than 1.5 g/dL and at least one of the following:
 - ✓ serum creatinine greater than or equal to 1.2 mg/dl,
 - ✓ blood urea nitrogen greater than or equal to 25 mg/dl,
 - ✓ serum sodium less than or equal to 130 mEq/l

Primary Prophylaxis of SBP

- Long-term **norfloxacin** 400 mg daily is preferred.
- If norfloxacin is unavailable, reasonable alternatives include trimethoprim-sulfamethoxazole one double-strength tablet daily, **ciprofloxacin** 500 mg PO daily, or **levofloxacin** 250 mg PO daily.

Secondary Prophylaxis of SBP

- Oral norfloxacin 400 mg twice daily or IV ofloxacin 400 mg daily for 7 days has been shown to prevent infection in patients with gastrointestinal hemorrhage.
- Ceftriaxone 1 g IV daily for 7 days has been shown to be superior to norfloxacin for the prevention of infection in a randomized control trial. Once patient is stable, return to oral regimen and the 7 days course is recommended.

Take Home Message



Summary Points

- New onset fever, abdominal pain, confusion, or other sign or symptom of infection in a cirrhotic patient should prompt an evaluation of the ascitic fluid for spontaneous bacterial peritonitis (SBP).
- Ascitic fluid should be sent for cell count and differential analysis and should be directly inoculated into blood culture bottles at the bedside.

Summary Points

- Patients with ascitic fluid PMN count greater than or equal to 250 cells/mm³ meet criteria for a presumptive diagnosis of SBP and should be treated with antibiotic therapy.
- Any cirrhotic patient with signs or symptoms concerning for SBP should be treated with antibiotic therapy regardless of ascitic fluid PMN count.

Summary Points

- Recommended regimens for primary and secondary SBP prophylaxis consist of oral norfloxacin 400mg daily.
- For patients with acute gastrointestinal hemorrhage, IV ceftriaxone 1 g IV daily is recommended for a total duration of 7 days.
- Adjunctive IV Albumin therapy is shown to decrease overall mortality.

