

# Spontaneous Bacterial Peritonitis

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## ABSTRACT

*Infected ascites is one of the complication happened in liver cirrhotic patient in ascites. There are 5 infected ascites classifications i.e. Spontaneous Ascites Infection Consist of Spontaneous Bacterial Peritonitis, Monomicrobial Non Neurocytic Bacteriascites, Culture Negative Neurocytic Ascites, Secondary Bacterial Peritonitis and Iatrogenic Polimicrobial Bacterascites.*

*Spontaneous Bacterial Peritonitis (SBP) is the infection in ascites without unrecognized intra abdominal infection source. The normal floras in the gastrointestinal, respiratory or urinal tract are the important infection source in SBP. As we know that normal ascites has ability to kill micro organism through phagocytosis function, opsonization, but when infected occurs ; phagocytosis function, opsonization, and MPS could be worst so that the possibility of being SBP increased.*

*The common frequently sign and symptom of SBP are fever, abdominal pain, consciousness assault, tenderness, diarrhea, paralytic ileus, hypotension and hypothermia.*

*Some of the invasive actions like endoscopy, variceal sclerotherapy and ligation may cause intestine flora translocation to mesenteric gland, bacterimia and infected ascites also made transmural passage intestine micro organism to ascites may cause infected ascites.*

*Cefotaxime is the antibiotic that more frequently studied to SBP patient. The dose of cefotaxime to SBP patient show that 2 gram/6 hours and 2 gram/12 hours injected produce SBP resolution and the same survival, besides that 2 gram/8 hours injected for 5 and 10 days also show the same effectively.*

*The antibiotic prophylaxis such as quinolon group show the effective result in liver cirrhotic with the gastroentestinal tract bleeding and low total protein (<1 gram/dl ) or has the SBP experience patients.*

**Keywords:** *infected ascites, Spontaneous bacterial peritonitis.*

## INTRODUCTION

Infected ascites is one of the complication happened in liver cirrhotic patient in ascites. There are 5 infected ascites classification i.e. Spontaneous Ascites Infection Consist of Spontaneous Bacterial Peritonitis, Monomicrobial Non Neurocytic Bacteriascites and Culture Negative Neurocytic ascites, Secondary Bacterial Peritonitis and Iatrogenic Polimicrobial Bacteriascites.<sup>1,7,16</sup>

Spontaneous Bacterial Peritonitis is a common complication happened in cirrhotic patient with ascites. The incidence rate of this case is 10-27 % to admit patient with liver cirrhotic with ascites. The mortality rate is high enough, until 25-40%. In fact, in patient with

severe liver disease hyperbilirubinemia, renal function disorder with encephalopathy, the mortality could reach 90 %. The high recurrent rate is 60% in the first year's attack. This shows that SBP was the permanent risk factor.<sup>4,7,13</sup>

Indonesian Society for the Study of the Liver have recommended cefotaxime antibiotic regimen as the first choice to treat this empiric Spontaneous Bacterial Peritonitis.<sup>8,14</sup>

The SBP prevention is the important attempt to decrease morbidity and mortality. The several survey of meta-analysis indicates that there are differences between patient who get therapy (83%) and not get therapy (73%) survival. In fact, in economic analysis

found that SBP prophylactic with antibiotic is better than diagnosis and treat.<sup>7,8</sup>

## DEFINITION

Spontaneous Bacterial Peritonitis (SBP) is the infection in ascites without unrecognized intra abdominal infection source. The etiology of this infection is the intracellular bacteria infection, especially intestines flora bacteria.<sup>4,7</sup>

## ETIOLOGY

The normal floras, in the gastrointestinal, respiratory, or urinary tract are the important infection source in SBP. Besides, the other infection source could get from the medical action. There are two theories on how the bacteria can get ascites, i.e. Transmural translocation theory and Bacteremia theory is more appropriate with SBP.<sup>6,20</sup>

According to the Indonesian research (Lesmana and Wiwik), E Coli is common bacteria which is found in SBP. Whereas the four other SBP bacteria which were found by Bhuvu and friends were E Coli, D group of Streptococcus, Kliebsiela pneumoniae and other gram negative aerobic bacteria.<sup>20</sup>

## CLASIFICATION

According to the culture, PMN account and availability the intra abdominal infection source, infected ascites could be classified as a followed:

## PATHOPHYSIOLOGY

In the liver cirrhotic with occur natural immune dysfunction (the first line body system defense). These assaults maybe as opsonization activity assault, Phagocyte cell dysfunction, MPS dysfunction. As a result, liver cirrhotic patient may has trend to gain spontaneous bacterimia caused SBP.<sup>7, 17, 18</sup>

As we know that normal ascites has ability to kill microorganism through phagocytosis function, opsonization. But when infected ascites occurs; phagocytosis function, opsonization, and MPS could be worst so that the possibility of being SBP increased. If the three functions were not too bad, so the possibility of being Cultural Negative Neurocytic Ascites (CNNA) would increase. The ascites will be sterile if these functions were good.<sup>7, 17, 18</sup>

## DIAGNOSIS

The diagnosis can make based on SBP clinical manifestation, ascites analysis, and ascites micro organism culture. The common frequently sign and symptom of SBP are fever, abdomeninal pain, consciousness assault, tenderness, diarrhea, paralytic ileus, hypotention and hypothermia. Ascites analysis will be done to count ascites PMN/mm<sup>3</sup> account. Whereas ascites microorganism culture was be considered as spesific but less sensitive. The microorganism culture was frequently found E. Coli and kliebsiella.<sup>1,8,20</sup>

The SBP diagnosis can make if, we will find:

- PMN count > 250 cells/mm<sup>3</sup> and a positive ascitic fluid culture
- PMN count > 250 cells/mm<sup>3</sup> followed or not with peritonitis symptom
- PMN count < 250 cells/mm<sup>3</sup> followed peritonitis symptom, and the reanalysis in 24 hours will be fount PMN count > 250 cells/mm<sup>3</sup>

## DIAGNOSIS RECOMMENDATION

(According to Indonesian Society for the Study of the Liver consensus, March 24<sup>th</sup> 2001 in Jakarta)

- Clinical manifestation
  - Primary: fever, abdominal pain
  - Secondary: shock, bleeding, mental status change, motility problem, hypotension etc.
  - Asymptomatic

Table 1. Classification of Infected Ascites

Type of Infection	PMN Count (per/mm <sup>3</sup> )	Culture
1. Spontaneous Bacterial Peritonitis (SBP)	≥ 250	+ (1 Microorganism)
2. Monomicrobial Non Neurocytic Bacteriascites (NANK)	< 250	+ (1 Microorganism)
3. Culture Negative Neurocytic Ascites (NANK)	≥ 250	+ ( No Growth )
4. Secondary Bacterial Peritonitis	≥ 250	+ ( Multiple Organism)
5. Polymicrobial Bacteriascites (iatrogenic)	≤ 250	+ ( Multiple Organism)

- Ascites punction indications:
  - The liver cirrhotic patient was attended to hospital with ascites in the first time.
  - The liver cirrhotic patient with ascites has been care appearing SBP clinical manifestation.
- Ascites punction procedure:
  - The minimal ascites fluid is 20 cc.
  - The suggestion assessment: protein, glucose and LDH
  - Culture: bedside with culture bottle will be suggested.
- Diagnosis criteria:  
SBP diagnosis could be made if the ascites PMN account = 250 cells/mm<sup>3</sup> followed by:
  - Monomicrobial possitive culture or
  - Negative culture i.e. CNNA (Culture Negative Neurocytic ascites ) as a SBP variant
- Diagnosis is not SBP  
If the ascites PMN account < 250 cells/mm<sup>3</sup> and monomicrobial positive culture i.e. MBN (Monomicrobial Non Neurocytic Bacteriascites).  
Note: If the clinical manifestation support SBP, it is necessary to attempt ascites repunction after 24 hours.

#### PREDISPOSITION FACTORS

Several factors can make a role in IAS. The decrease in kupfer cell function, the decrease in leucocytes especially PMN account and function as a result of hypersplenism and decrease of complement synthesis by liver. These caused the decrease of opsonization activity and phagocytosis that made the liver cirrhotic patient easily get infection, especially to the chronic liver diseases.<sup>18,21</sup>

The gastrointestinal tract bleeding (hematemesis and melena) easily makes microorganism intestine translocation through intestine wall and be support by the decrease of RES function may make bacterimia and infected ascites.<sup>7</sup>

Some of the invasive actions like endoscopy, variceal sclerotherapy and; ligation may cause intestine flora translocation to mesenteric gland, bacterimia and infected ascites also made transmutable passage intestine microorganism to ascites may cause infected ascites.<sup>7</sup>

#### TREATMENT

The empirical antibiotic treatment have to begin immediately after the diagnosis is made without recognizing the kind of microorganism and the sensitive test has been done, these prevent further complications,

such as septicemia and hepatic encephalopathy.<sup>2</sup>

According to some research in local and abroad this country, the microorganism that frequently found were aerobic negative gram species (Enterobacteriaceae) and streptococcus spp. Therefore the antibiotic has to have and ability to eliminate the both species and overcome intraperitoneum infection, also have the minimal side effect especially nefrotoxic.<sup>3,20</sup>

Cefotaxime is the antibiotic that more frequently research to SBP patient. This study about the dose of cefotaxime to SBP patient shows that 2 gram/6 hours and 2 gram/12 hours injected produce SBP resolution and the same survival. Besides that 2 gram/8 hours injected for 5 and 10 days also show the same effectivity. Because of that, the successful for SBP therapy with cefotaxime may get with the low dose and short time that is 2 gram/12 hours for 5 days. The clinical experience of some centre in Indonesia show those 1 gram cefotaxime/12 hours for 5 day show the better result.<sup>9,11,14</sup>

The treatment with the other cefalosforin give the same result with cefotaxime, but there is no further study about the optimal dose and the time. In the certain SBP without complication research (there are no bleeding, mental status change, hypotension) Ofloxalene 400 mg/12 hours injected showed the same result with cefotaxime 2 gram/6 hours.<sup>9, 14</sup>

The antibiotic prophylaxis such as quinolon group show the effective prove in liver cirrhotic with the gastrointestinal tract bleeding and low total protein (<1 gram/dl) or has the SBP experience patients<sup>5,6,11,19</sup>

#### RECOMMENDATION TREATMENT

(According to Indonesian Society for the Study of the Liver-Jakarta, March 24<sup>th</sup> 2001)

- Empirical treatment has done if ascites PMN > 250 /mm<sup>3</sup> with the first choice is cefotaxime.
- The cefotaxime dose is 2 x 1 gram a day.
- For 5-7 days.
- The observed treatment may attempt after 48 hours by account ascites PMN (suggested).
- The secondary empirical treatment:
  - Coamoxiclave (amoxiciline 1 gram-clavulanic acid 200mg), intravenously, 4 times a day for 5-7 days.
  - Quinolon (ofloxacin 400 mg and cyprofloxacin 500 mg) twice a day for 5-7 days to asymptomatic SBP patient only/without complication.

## Note:

The liver cirrhotic patient with ascites that followed the peritonitis symptom and the puncture is not capable; we could give the empirical antibiotic directly.

## PROPHYLAXIS

The SBP prevention could be done in some liver cirrhotic patient criteria, i. e.<sup>5,6,8</sup>

- The liver cirrhotic patient with gastrointestinal tract bleeding.
- The liver cirrhotic patient with bleeding and has SBP history.
- The liver cirrhotic patient with ascites but without bleeding.

Long acting antibiotic injected can result resistance. As a result that the decrease of SBP incident because of negative gram microorganism followed by the increase of SBP incident because of positive gram microorganism.

The SBP prevention could increase the survival. The long attempt prevention primary refers to liver cirrhotic patient with bleeding and the patient who has SBP history. The result of research proves that the prevention SBP with the per-oral antibiotic is more successful than diagnosis and treat. The SBP prevention is done by oral antibiotic, especially to negative gram microorganism. There fore it is necessary to observe the resistance and the increase of SBP incident because of positive gram microorganism.<sup>5,6,8</sup>

Prophylaxis Recommendation Therapy.<sup>8,19</sup>  
(According to PPHI consensus Jakarta, March 24<sup>th</sup> 2001)

- Primary
  - The gastrointestinal bleeding with or without ascites.
  - Invasive procedure.

## Prophylaxis choice

- Quinolone (Ciprofloxacin 500 mg and Ofloxacin 400 mg) twice a day for 5-7 days.
- Standard dose of cotrimoxazole for 5-7 days.
- Secondary  
The patient with SBP history, <1 gram % protein, child C cirrhotic, secondary prophylaxis can be considered by long term norfloxacin antibiotic.

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