Peritonitis: how to deal with it?
From the recent literature, the expected mortality of secondary peritonitis in the adult, all primary diseases and conditions included, is:

1. 7%
2. 12%
3. 17%
4. unknown
A peritonitis generalized to the entire abdomen can be compared for the hemodynamic consequences to:

1. 15% of total body skin burn
2. 25% of total body skin burn
3. 35% of total body skin burn
4. 50% of total body skin burn
The **first defense** against bacterial peritoneal contamination is:

1. An immediate response of macrophages present in the peritoneal fluid
2. The mechanical elimination of bacteria through the diaphragmatic lymphatics
3. Fibrin polymerisation trapping the bacteria
4. The action of phagocytic cells from the omentum
Peritonitis: how to deal with it?

Question 4
Bacteriology of secondary peritonitis

The more frequent pathogens isolated (except cirrhosis) are:

1. E. Coli
2. Streptococci
3. Enterococci
4. Anaerobic bacteria
Peritonitis: how to deal with it?

Question 5
Laparoscopic procedures in secondary peritonitis

There are major arguments to propose that:

1. The conversion rate is the highest after bariatric complicated procedure
2. Laparoscopy for experimental peritonitis increases the incidence of endotoxemia
3. In the child, based on prospective trial, laparoscopy leads to a decrease in peritoneal secondary abscesses.
4. Parenteral nutritional support does not change the outcome of acute peritonitis.
Peritonitis: how to deal with it?

Excluding Liver and Pancreas

WHO: Mortality Statistics peritonitis by country

World Inventory: 9,669 deaths

<table>
<thead>
<tr>
<th>Country</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>1,661</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>1,184</td>
</tr>
<tr>
<td>JAPAN</td>
<td>963</td>
</tr>
<tr>
<td>ARGENTINA</td>
<td>679</td>
</tr>
<tr>
<td>SPAIN</td>
<td>619</td>
</tr>
<tr>
<td>GERMANY</td>
<td>603</td>
</tr>
<tr>
<td>BAHAMAS</td>
<td>1</td>
</tr>
<tr>
<td>ICELAND</td>
<td>1</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>0</td>
</tr>
</tbody>
</table>

not an epidemiologic challenge
Peritonitis: how to deal with it?

Mortality reported in the literature (except pancreas)

<table>
<thead>
<tr>
<th>Mortality (%)</th>
<th>Year</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 – 27%</td>
<td>2006</td>
<td>Gupta &amp; Kaushik</td>
</tr>
<tr>
<td>10%</td>
<td>2011</td>
<td>Miccini et al.</td>
</tr>
<tr>
<td>10%</td>
<td>2007</td>
<td>Agarwal et al.</td>
</tr>
<tr>
<td>13%</td>
<td>2010</td>
<td>Klarenbeek et al.</td>
</tr>
<tr>
<td>17%</td>
<td>2011</td>
<td>Egashira et al.</td>
</tr>
<tr>
<td>18%</td>
<td>2011</td>
<td>Singh et al.</td>
</tr>
<tr>
<td>20%</td>
<td>2011</td>
<td>Strobel et al.</td>
</tr>
<tr>
<td>25%</td>
<td>2011</td>
<td>Theunissen et al.</td>
</tr>
<tr>
<td>30%</td>
<td>2011</td>
<td>Maghsoudi &amp; Ghaffari</td>
</tr>
</tbody>
</table>

Untreated peritonitis is poor, usually resulting in death.

Peritonitis is dangerous for health

40%

...considering every Condition ...!!!

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Peritonitis: how to deal with it?

How to deal with physiology?

Largest extra vascular space in the body. Identical to skin surface.
Peritonitis: how to deal with it?

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The 50 ml of peritoneal fluid have a minimal antibacterial activity < 300 lymphocytes and macrophages / mm³
Peritonitis: how to deal with it?

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Peritonitis: how to deal with it?

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Peritonitis: how to deal with it?

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Peritonitis: how to deal with it?

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The main system of peritoneal decontamination is **diaphragm**

**Lymphatics**

The hemodynamic effect of peritonitis is similar of

**50 % body surface burn**
Peritonitis: how to deal with it?

Intra-abdominal infections result in 2 major clinical manifestations and 2 types of phenomenons

1. Early or diffuse infection results in localized or generalized peritonitis.
2. Late and localized infections produce an intra-abdominal abscess.

1. Primary: Caused by the spread of an infection from the blood & lymph nodes to the peritoneum. Very rare < 1%
2. Secondary: Caused by the entry of bacteria or enzymes into the peritoneum from the gastrointestinal or biliary tract
Peritonitis: how to deal with it?
Peritonitis: how to deal with it?

How to deal with anatomy?

Folds and recesses of posterior abdominal wall

Transverse section of the abdomen showing peritoneal reflection

Sagittal section of female abdomen and pelvis showing peritoneal reflection

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Peritonitis: how to deal with it?

How to deal with anatomy?
.....................especially when it change with position!!!!!!!

- Hepato-renal recess is the lowest part of the peritoneal cavity when the subject is supine.
Peritonitis: how to deal with it?

- Right subdiaphragmatic abscess
- Right subhepatic abscess
- Right paracolic abscess
- Right lower quadrant abscess
- Phrenicocolic ligament
- Left paracolic abscess
- Pelvic abscess

From Doherty 2010
Peritonitis: how to deal with it?

1. Acute appendicitis.
2. G D Ulcer
3. Small bowel perforation.
4. Gangrenous cholecystitis
5. Ectopic pregnancy.
7. Acute salpingitis and ovarian cyst
8. Meckel's diverticulum.
9. Mesenteric vascular occlusion
10. Acute conditions of abdominal wall (abscess, complicated hernia)
Peritonitis: how to deal with laparoscopy?

1. Acute appendicitis. **REMOVE**
2. G D Ulcer **SUTURE**
3. Intestinal perforation. **REM OR SUT**
4. Acute cholecystitis **REMOVE**
5. Ectopic pregnancy. **REMOVE**
6. Diverticulitis **REM OR SUT**
7. Torsion of ovarian cyst **REMOVE**
8. Meckel's diverticulum. **REMOVE**
8. Mesenteric vascular occlusion **REMOVE**
9. Acute conditions of abdominal wall **REMOVE**
Peritonitis: how to deal with it?

The prompt diagnosis and early treatment are essential.
Peritonitis: how to deal with it?
Peritonitis: how to deal with it?

Hospitalization, Fluid replacement

Surgery to remove the source of infection

Antibiotics intravenously

Pain Killer

Dietary supplements

(omega 3, omega 6 fatty acids, vitamin A, E, C, and zinc)
Peritonitis: how to deal with it?

- Is the sequence a golden standard????
- IV fluids and electrolyte replacement
- Systemic antibiotics
- ICU Support
- Lavage drainage
- Correction of the underlying cause
- Treatment monitoring

Doherty 2006
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Peritonitis: how to deal with it?

- E Coli
- Enterococcus
- Proteus
- Bacteroides fragilis
Peritonitis: how to deal with it?

Antibiotics

Amoxycilin + Clavulanic acid
   Augmentin® 3 X 2 Gr

3th gen Cephalosposin + Metronidazole
   Zinacef ® 3 X 1.5 Gr
   Flagyl ® 3 X 500 mg
Peritonitis: how to deal with it?

Large consensus for Laparoscopic diagnosis and treatment
Peritonitis: how to deal with it?
Influence of peroperative lavage solutions on peritoneal defence mechanisms in vitro

van Westreenen European Journal of Surgery 1999

Sodium chloride, Hartmann's solution, povidone-iodine, Dakin's solution, taurolidine, chlorhexidine, and hydrogen peroxide ….

All poison and stimulate mesothelial cells and neutrophils, and some solutions are more potent than others

the more concentrated the solution the greater the effect on these cells.
Peritonitis: a consensus?

Prompt management

Perfusion with Amoxycillin + Clav ac.

CT Scan

Laparoscopic approach with meticulous NaCl lavage

Removal of the primary disease

Intensive monitoring and second look is needed