GdP Dialisi Peritoneale | SIN Società Italiana di Nefrologia

US di Dialisi Peritoneale
Spedali Civili di Brescia

I° BRIXIA DP MEETING

CORSO DI FORMAZIONE IN DIALISI PERITONEALE

BRESCIA
4-6 APRILE 2024

Con il patrocinio di:

Sistema Socio Sanitario
Regione Lombardia
ASST Spedali Civili

UNIVERSITÀ DEGLI STUDI DI BRESCIA

LA GESTIONE DELLE PERITONITI
DALLA DIAGNOSI ALLE TERAPIE

GIANFRANCA CABIDDU (CAGLIARI)

ISPD Peritonitis Guideline Recommendations: 2022 Update on Prevention and Treatment

PERITONEAL DIALYSIS INTERNATIONAL

Definitions and measurement of peritonitis

- ❑ *Cause-specific peritonitis*
- ❑ *Time-specific peritonitis*
- ❑ *Outcomes-specific definitions*

Prevention of peritonitis

- ❑ *Catheter placement*
- ❑ *Exit-site care*
- ❑ *Contamination of PD system*
- ❑ *Invasive G.I. and Gynecological procedures*
- ❑ *Training program*
- ❑ *Domestic pet and zoonotic infections*

Treatment of peritonitis: initial and subsequent

- ❑ *Identification of causative organisms*
- ❑ *Empiric antibiotic selection*
- ❑ *Dosage of antibiotics*
- ❑ *Antibiotic delivery and stability*

Monitoring response to peritonitis treatment

(including indications for catheter removal)

- ❑ *Refractory peritonitis*
- ❑ *Relapsing, recurrent and repeat peritonitis*

Return to PD after cessation of PD

(due to peritonitis-related catheter removal

These recommendations are evidence-based where evidence is available, and if multiple reports are available, findings from the more recent publications have been incorporated by the committee.

Philip Kam-Tao Li, Kai Ming Chow, Yeoungjee Cho, et al. ***ISPD Peritonitis Guideline Recommendations: 2022 Update on Prevention and Treatment.***
Perit Dial Int. DOI:10.1177/08968608221080586
Visual Graphic by Edgar Lerma, MD

Definitions and measurement of peritonitis

- *Cause-specific peritonitis*
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PERITONEAL DIALYSIS INTERNATIONAL

Peritoneal Dialysis International 2022, Vol. 42(2) 110–153

DEFINITIONS OF PERITONITIS

We recommend *that peritonitis should be diagnosed* when ***at least two of the following are present***:

1) clinical features consistent with peritonitis, that is, **abdominal pain and/or cloudy dialysis effluent**

2) **dialysis effluent white cell count > 100/µL** (*after a dwell time of at least 2 h*), **with > 50% polymorphonuclear leukocytes**

3) **positive dialysis effluent culture (1C)**

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DIFFERENTIAL DIAGNOSIS OF CLOUDY EFFLUENT

Cellular causes

PMN leucocytes

Culture-positive infectious peritonitis

Infectious peritonitis with sterile cultures

Eosinophils

Dialysate eosinophilia

Chemical peritonitis

Monocyte/macrophages

Specimen taken from ‘dry’ abdomen (after prolonged peritoneal rest)

Red blood cells

Hemoperitoneum

Malignant cells

Lymphoma

Peritoneal metastasi

Non-cellular causes

Fibrin

Triglycerides (milky white appearance of effluent)

Calcium channel blockers

Lymphatic obstruction

Acute pancreatitis

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MEASUREMENT OF PERITONITIS

- **We recommend** that every programme should monitor, *at least on a yearly basis*, *the incidence and outcomes of peritonitis* **(1C).**

- **We recommend** *that the parameters monitored* should include the PD-related *peritonitis rate*, *organism-specific peritonitis rates*, *antimicrobial susceptibilities* of the infecting organisms, *culture negative peritonitis and peritonitis outcomes* **(1C).**

- **We recommend** that the ***overall peritonitis rate should be no more than 0.40 episodes per year* at risk (1C).**

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Treatment of peritonitis: initial and subsequent

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PERITONEAL DIALYSIS INTERNATIONAL

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Treatment of peritonitis: initial and subsequent

- *Identification of causative organisms*
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The *algorithm* of *initial management* for PD patients presenting with a clinical diagnosis of peritonitis

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Treatment of peritonitis: initial and subsequent

- ❑ *Identification of causative organisms*
- ❑ *Empiric antibiotic selection*
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- ➢ **CLINICAL EVALUATION**
- ➢ **EXAMINE EXIT SITE AND CATHETER TUNNEL**
- ➢ **COLLECT PD FLUID FOR CELL COUNT, DIFFERENTIAL COUNT, GRAM STAIN AND CULTURE**

- **We recommend** that *PD effluent be tested for cell count, differential, gram stain and culture whenever peritonitis is suspected* **(1B).**
- **We recommend** that the **blood culture bottle(s) be the preferred technique** *for bacterial culture of PD effluent* **(1C).**
- **We recommend** that PD patients presenting ***with cloudy effluent be presumed to have peritonitis and treated as such until the diagnosis can be confirmed or excluded*** **(1C).**

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Treatment of peritonitis: initial and subsequent

- ❑ *Identification of causative organisms*
- ❑ *Empiric antibiotic selection*
- ❑ *Dosage of antibiotics*
- ❑ *Antibiotic delivery and stability*

- ➢ **Start IP antibiotics as soon as possible**
- ➢ **Allow to dwell for at least 6 hours**
- ➢ **Empirical gram-positive and gram-negative coverage *based on patient history and center sensitivity patterns* (1C)**

Gram-positive coverage	**Gram-negative coverage**	**Monotherapy with 4°generation cephalosporin**
***First-generation cephalosporin or vancomycin* (1B)**	***Third-generation cephalosporin or aminoglycoside* (1B)**	*(2B)*

- ➢ **Pain control**
- ➢ **IP heparin**
- ➢ **Recommend anti-fungal prophylaxis (1B)**

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Treatment of peritonitis: initial and subsequent

- Identification of causative organisms
- Empiric antibiotic selection
- Dosage of antibiotics
- Antibiotic delivery and stability

- **We recommend** that ***IP antibiotics be the preferred route of administration*** as long as the compatibility and stability of the IP antibiotics allow, *unless the patient has features of systemic sepsis* **(1B).**
- ***We suggest*** that *IP aminoglycoside be administered as daily intermittent dosing (2B).*
- **We recommend** that ***prolonged courses of IP aminoglycoside be avoided*** **(1C).**
- ***We suggest*** that adjunctive *oral N-acetylcysteine therapy may help to prevent aminoglycoside ototoxicity (2B).*
- *There is insufficient evidence to make a recommendation as to whether patients on APD should be temporarily switched to CAPD during treatment of peritonitis (Not Graded).*

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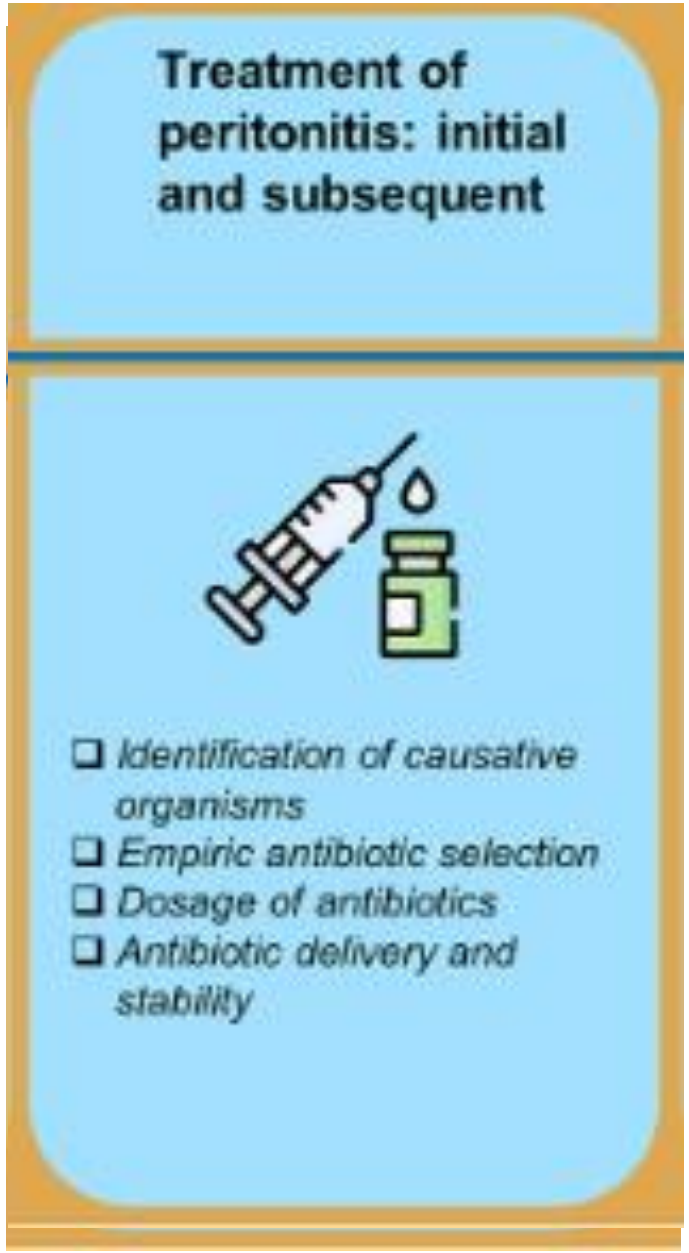

SUBSEQUENT MANAGEMENT OF PERITONITIS

- **We recommend** *that antibiotic therapy be adjusted once results and sensitivities are known* **(1C).**

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SUBSEQUENT MANAGEMENT OF *PERITONITIS GRAM-POSITIVE*

Staphylococcus Aureus

Enterococcus

Streptococci

Other gram-positive organism *including coagulase-negative Staphylococcus*

CONTINUE GRAM-POSITIVE COVERAGE BASED ON SENSITIVITIES

STOP GRAM-NEGATIVE COVERAGE

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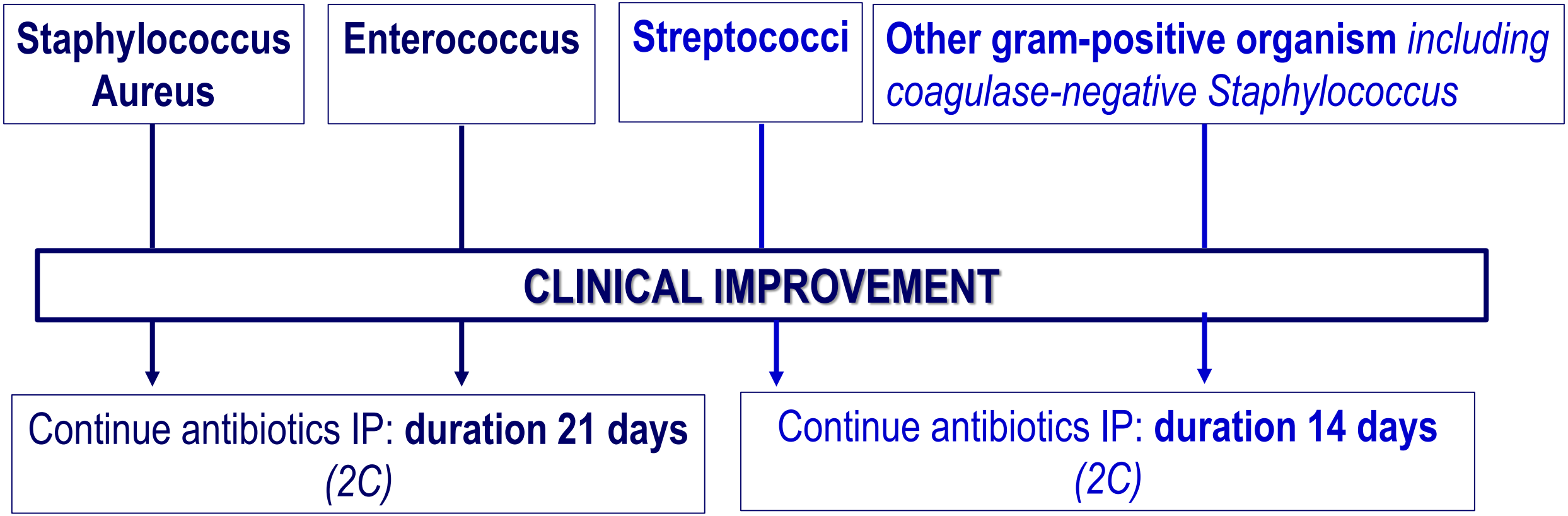
SUBSEQUENT MANAGEMENT OF *PERITONITIS GRAM-POSITIVE*



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Other gram-positive organism *including coagulase-negative Staphylococcus*

NO CLINICAL IMPROVEMENT BY 5 DAYS
ON APPROPRIATE ANTIBIOTICS

SURGICALLY REMOVE PD CATHETER
AFTER CATHETER REMOVAL *PATIENT TO REMAIN ON TREATMENT FOR 14 DAYS*

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SUBSEQUENT MANAGEMENT OF *PERITONITIS GRAM-NEGATIVE*

Pseudomonas

Stenotrophomonas

Give 2 effective antibiotics with different mechanism based on sensitivity

IP ceftazidime or cefepime + gentamicin/tobramycin/amikacin or oral ciprofloxacin

Give 2 effective antibiotics with one of them being oral trimethoprim-sulphamethoxazole

If no improvement after 5 days on appropriate antibiotics remove catheter and treat for 14 days after catheter removal

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Peritonitis resolves but persistent exit site or tunnel infection ➡ *consider simultaneous catheter removal and re-insertion*

SUBSEQUENT MANAGEMENT OF PERITONITIS *GRAM-NEGATIVE*

Enteric gram-negative bacteria

Not otherwise specified

According to susceptibility

IP ceftazidime or
IP cefepime or
oral ciprofloxacin

Extended-spectrum beta-lactamase ESBL producing

IP meropenem or
oral ciprofloxacin if susceptible

AmpC beta-lactamase producing

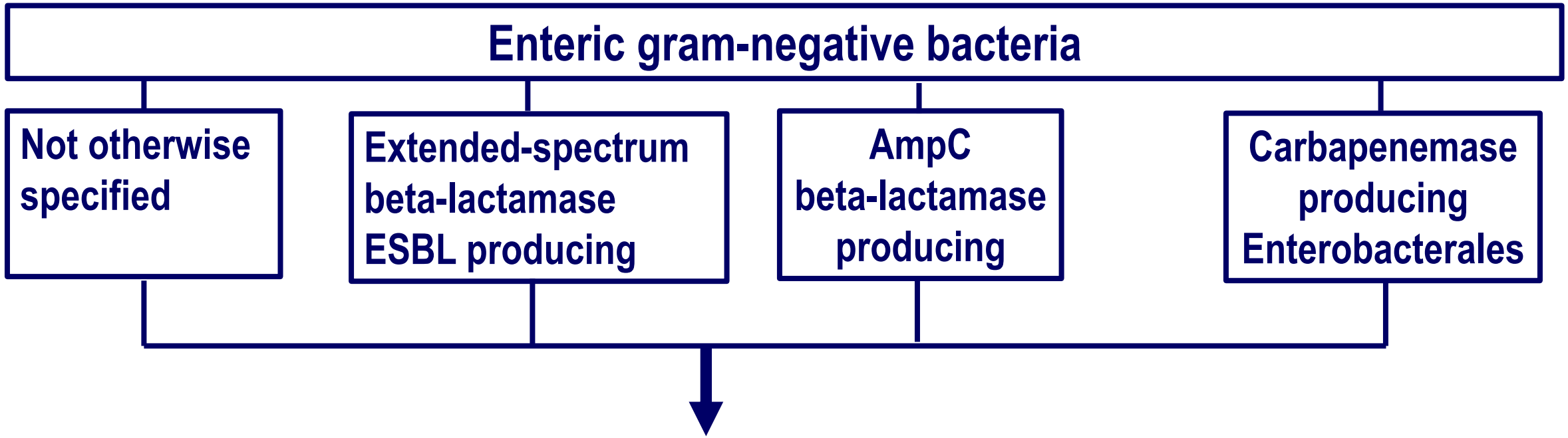
SPICE organisms (**S**erratia, **P**rovidencia, **I**ndolepositive Proteus, **C**itrobacter freundii and **E**nterobacter species)

IP cefepime or
oral ciprofloxacin or
IP meropenem

Carbapenemase producing Enterobacterales

Susceptibility profile
Expert advice

SUBSEQUENT MANAGEMENT OF PERITONITIS *GRAM-NEGATIVE*



If no improvement after 5 days on appropriate antibiotics remove catheter and treat for 14 days after catheter removal

MANAGEMENT OF FUNGAL PERITONITIS

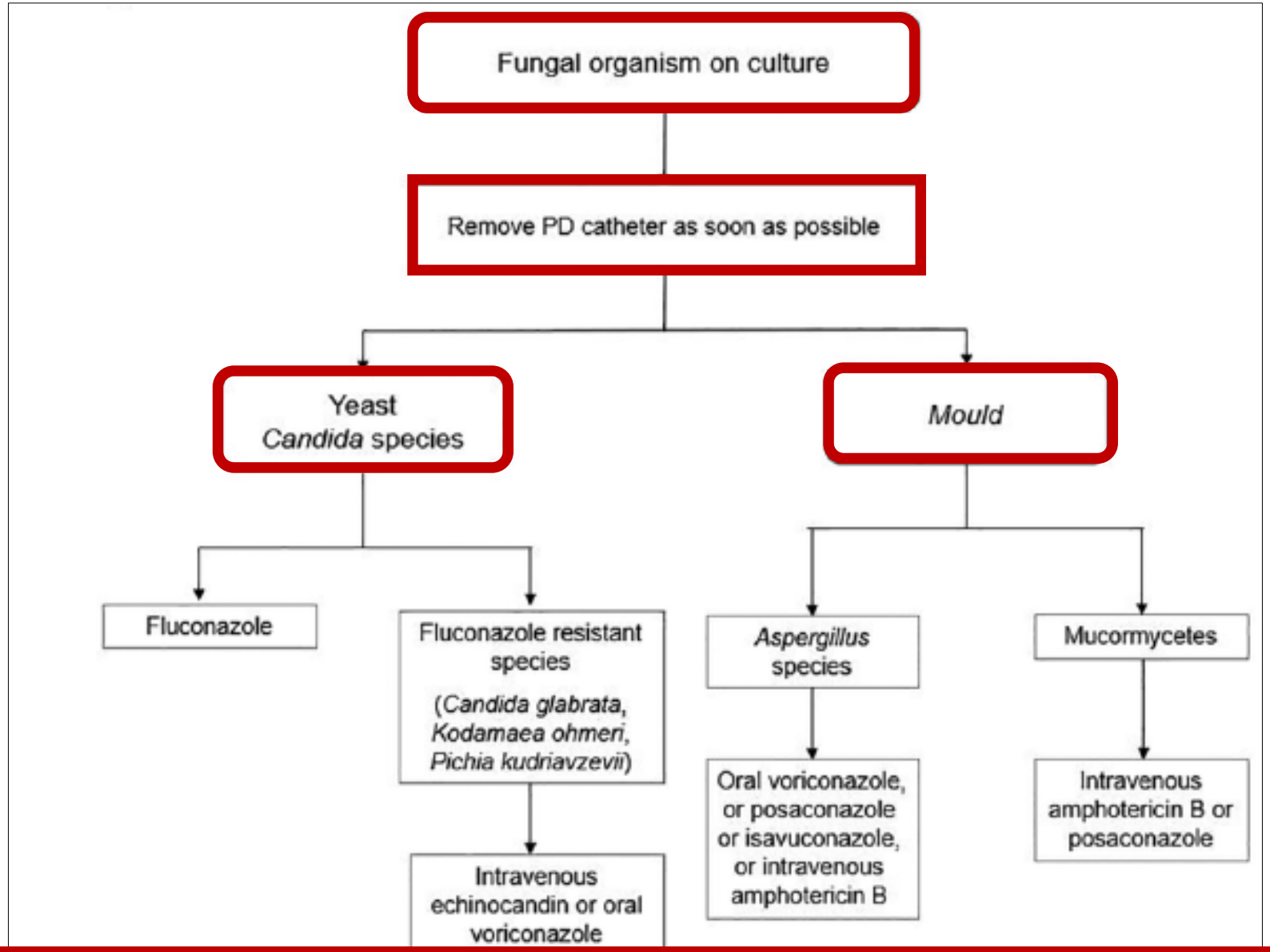
We recommend immediate catheter removal ***when fungi are identified in PD effluent*** **(1C)**

Treatment failure and mortality rates *of fungal peritonitis* **remain high**!

In view of the **high biofilm production** observed in fungal peritonitis, **we recommend immediate catheter removal** *as the best option to reduce the high mortality of fungal peritonitis.*

Despite the availability of newer antifungal drugs, **catheter removal remains the cornerstone of managing fungal peritonitis.**

Management algorithm for fungal peritonitis



We suggest that **treatment** *with an appropriate antifungal agent* **be continued for at least 2 weeks after catheter removal** *(2C)*

PERITONITIS *CULTURE NEGATIVE*

- **Culture-negative peritonitis** is defined when peritonitis is diagnosed using the criteria (one and two), **but no organism is identified on culture of dialysis effluent**
- **We recommend** the proportion of **culture-negative peritonitis** *should be* **less than 15%** *of all peritonitis episodes (1C).*

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- **We recommend** the proportion of **culture-negative peritonitis** *should be* **less than 15%** *of all peritonitis episodes (1C).*
- ***We suggest that sampling and culture methods be reviewed*** **and improved** if more than 15% of peritonitis episodes are culture negative *(2C).*

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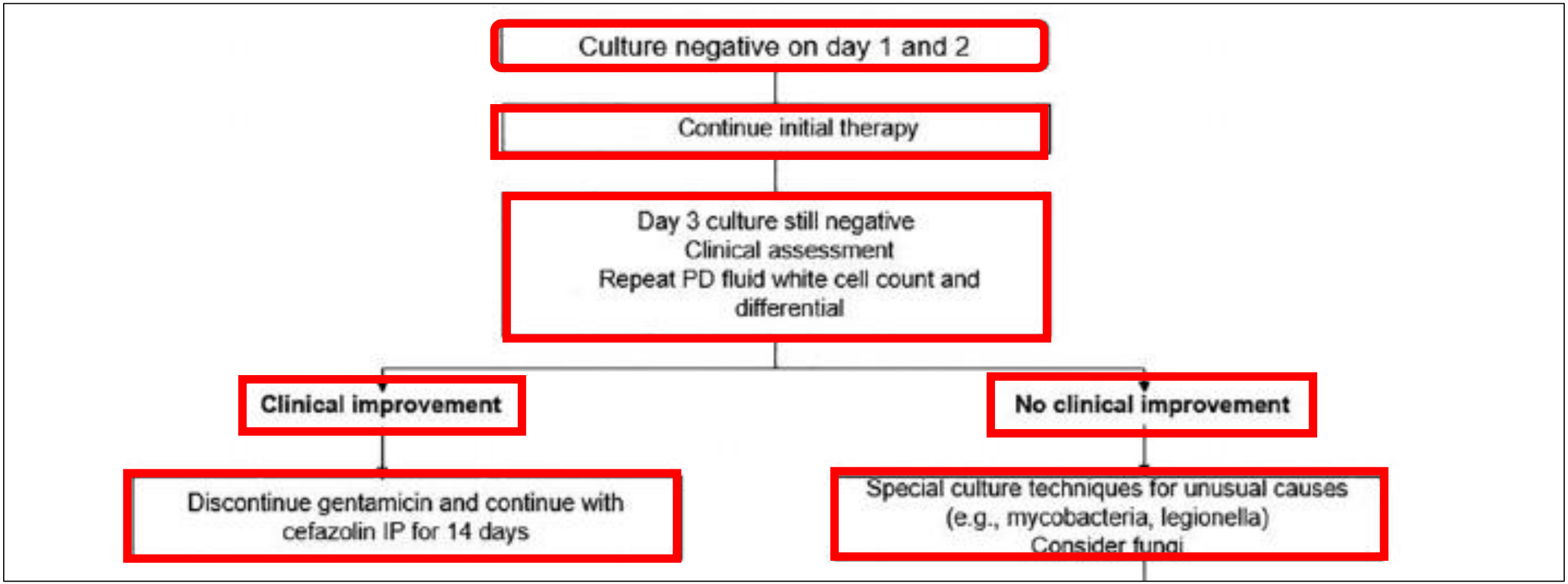
Management algorithm for culture-negative peritonitis



Monitoring response to peritonitis treatment

(including indications for catheter removal)

- ❑ *Refractory peritonitis*
- ❑ *Relapsing, recurrent and repeat peritonitis*

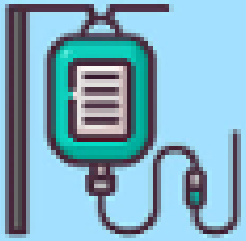
WHEN TO REMOVE THE PERITONEAL CATHETER?

WHEN TO REMOVE THE PERITONEAL CATHETER?

- **We recommend** that *PD catheter be removed* in **refractory peritonitis** episodes, *defined as failure of the PD effluent to clear* ***after 5 days*** *of appropriate antibiotics* **(1D).**
- **We recommend** timely PD catheter removal be considered for **relapsing, recurrent or repeat peritonitis episodes (1C).**
- **We suggest** *that Pseudomonas peritonitis with concomitant exit-site and tunnel infection be treated with catheter removal (2D).*
- For patients with ***concomitant S. aureus /Corynebacterium/ Multiple gram positive organism exit-site or catheter tunnel infection*** *catheter removal should be considered.*

Return to PD after cessation of PD

(due to peritonitis-related catheter removal



We suggest that **simultaneous PD catheter removal and reinsertion** be considered *after culture of the PD effluent has become negative and the PD effluent white cell count is below 100/mL,* ***in the absence of concomitant exit site or tunnel infection*** *(2C).*

The simultaneous removal and reinsertion of catheter procedure should be carried out under perioperative antibiotic coverage

PERITONEAL DIALYSIS INTERNATIONAL

Prevention of peritonitis

- *Catheter placement*
- *Exit-site care*
- *Contamination of PD system*
- *Invasive G.I. and Gynecological procedures*
- *Training program*
- *Domestic pet and zoonotic infections*

We recommend that *systemic prophylactic antibiotics be administered immediately prior to catheter placement* **(1A).**

• **We recommend** PD patients *take extra precautions* to prevent peritonitis if domestic pets are kept **(1C).**
• ***We suggest*** pets not be allowed in the room where PD exchange takes place, and where dialysis tubing, equipment and machine are stored *(2A).*

atment of exit-site or nnel infection ***is*** *to reduce subsequent isk*

PREVENTION OF PERITONITIS

We suggest prophylactic antibiotics *after wet contamination* of the PD syst to prevent peritonitis *(2D).*

To prevent fungal peritonitis, **we recommend that anti-fungal prophylaxis be co-prescribed whenever PD patients receive an antibiotic course**, regardless of the indication for that antibiotic course **(1B)**

ggest *antibiotic prophylaxis prior to colonoscopy invasive gynaecological procedure (2D).*
ggest drainage of PD fluid to keep the *abdomen efore endoscopic gastrointestinal and invasive or ntal gynaecological procedures (2D)*

We recommend that PD exchange technique and knowledge *be regularly reassessed and updated*, with an emphasis on direct inspection of practice of PD technique **(1C).**

• ***We suggest*** that **avoidance and treatment of hypokalaemia** may reduce the risk of peritonitis *(2C).*
• ***We suggest*** that *avoiding or limiting the use of histamine-2 receptor antagonists* may prevent enteric peritonitis *(2C).*