Aeromonas spp (LTR62251)

Edit Approved By: Solomon, Natalia (05/03/2022) **Revision: 5.00**

Organism

Aeromonas spp. *

- *A. bestiarum*
- *A. enteropelogenes (A. trota)*
- *A. eucrenophila*
- *A. hydrophila*
- *A. jandaei*
- *A. media*
- *A. punctata (caviae)*
- *A. salmonicida ssp salmonicida*
- *A. schubertii*
- *A. sobria*
- *A. veronii*

* other species have been isolated from human specimens but are not thought to be pathogenic

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Clinical

These organisms are found in water sources (freshwater and saltwater) and various food sources. They are associated with intestinal and extraintestinal infections. Intestinal infections (diarrhea) are more common in summer months, ranging from mild to severe, and are usually self-limiting. Rarely they may be prolonged (cholera-like) and may be associated with bacteremia/septicemia and hemolytic uremic syndrome. Septicemia is more common in patients who have hepatobiliary disease and who are immunocompromised. Extraintestinal infections include septicemia (especially burn-associated), meningitis, skin/soft tissue, bone/joint infections, pneumonia, wound infections, ophthalmic infections, and intra-abdominal infections. Extraintestinal infections may be secondary to intestinal infection or may occur following injury/contact with contaminated water (especially in immunocompromised patients). Wound infections have been described in patients receiving leech therapy.

Usual susceptibility pattern

Aeromonas species have a diversity of beta-lactamases resulting in variable patterns of resistance among the different species. *Aeromonas spp* are resistant to ampicillin (except *A. trota*), amoxicillin-clavulanate (except *A. trota*, *A. schubertii*), first and second generation cephalosporins (except *A. veronii, A. schubertii*). They are usually susceptible to third generation cephalosporins, although *A. hydrophila* and *A. caviae* may produce an inducible chromosomal cephalosporinase and a carbapenemase resulting in broad spectrum beta lactam resistance. Carbapenemase activity alone has also been described in *A. hydrophila*, *A. veronii* and *A. jandaei.* In those species, the carbapenemase is not well detected by automated systems, as MICs to 3rd generation cephalosporins and/or carbapenems may not be markedly increased. Plasmid mediated extended spectrum beta lactamases and carbapenemases (VIM, GES, IMP, and KPC) have also been described in some *Aeromonas spp.* They are usually susceptible to quinolones, tetracyclines, TMP-SMX and aminoglycosides (although resistance may be increasing).

Aeromonas spp., Continued

Susceptibility method

VITEK2 (*A. hydrophila, A. caviae,* and *A. sobria* only).
Additional testing done by Disc diffusion or Etest method using Mueller-Hinton agar incubated in ambient air at 35°C for 16-20 hours.

Note: For Etest method – use 0.5 McFarland suspension in saline.
For mucoid strains use 1.0 McFarland.

Susceptibility reporting

	CSF/ Brain	Blood/Sterile Body Site/ Endovascular catheter	Stool	Other	Comments
Amox/Clav		R		R	
Ampicillin	R	R		R	
Cefazolin		R		R	
Cefotaxime	*	*		*	*Test and report for patients < 1 month Test by Etest method. **See Special Considerations**
Ceftriaxone	✓	✓		✓	Etest method Do not report in patients < 1month For patients < 1 month test and report cefotaxime by Etest **See Special Considerations**
Ciprofloxacin		✓	✓	✓	Do not report on patients < 18 y **See Special Considerations**
Ertapenem		2		2	**See Special Considerations** Always test by disc diffusion Always report if I/R 2nd line if cipro, ceftriaxone, imipenem or meropenem I/R If S do not report in patients < 3 months
Gentamicin		✓		✓	
Imipenem *	†	2		2	**See Special Considerations** Always test by disc diffusion Always report if I/R 2nd line if cipro, ceftriaxone, ertapenem or meropenem I/R †Test but do not report
Meropenem	✓	2		2	**See Special Considerations** Always test by disc diffusion Always report if I/R 2nd line if cipro, ceftriaxone, ertapenem or imipenem I/R
Tetracycline		✓	✓	✓	Test by disc diffusion Do not report on patients < 8 y
TMP-SMX		✓	✓	✓	

* Do NOT report Imipenem from the VITEK

Note:

Stool isolates: report susceptibility results only if:

- Patient < 12 months or > 65 years of age
- Patient with immunosuppression
- Patient is a food handler
- Request by physician

For all **stool isolates**, add comment:
"This organism may cause self-limiting diarrhea. Antibiotic treatment is generally not recommended unless symptoms are severe or prolonged or patient is immunocompromised". **(21375)**

Notify Infection Control and/or Public Health.

Special considerations

<table>
<tr><td>Ceftriaxone/ cefotaxime:</td><td>Confirm ceftriaxone by Etest. Note 1 Test cefotaxime by Etest for patients < 1 month.

<table><tr><th>If ceftriaxone/ cefotaxime is:</th><th>Then:</th></tr><tr><td>≥ 2 µg/mL</td><td>• Report as R</td></tr><tr><td>< 2 µg/mL</td><td>• Report as S
• Add comment: "This organism may produce an inducible cephalosporinase. Therapy with cephalosporins may result in clinical failure despite in vitro susceptible result". &2137</td></tr></table>
Note 1: Some isolates produce an inducible beta-lactamase that may not be detected by automated systems.</td></tr>
<tr><td>Ciprofloxacin:</td><td>Current CLSI breakpoints may not detect low level resistance as treatment failures have been noted for Aeromonas spp. with elevated but susceptible cipro MICs.
Use EUCAST breakpoints:

EUCAST breakpoints:
<table><tr><th>MIC</th><th>Interpretation</th></tr><tr><td>≤ 0.25 µg/mL</td><td>S</td></tr><tr><td>≥ 0.5 µg/mL</td><td>R</td></tr></table>
Add comment: "Interpretation is based upon EUCAST breakpoints." #BEUC</td></tr>
</table>

Special considerations (continued)

<table>
<tr><td rowspan="4">Ertapenem/
Imipenem/
Meropenem:</td><td>For all non-stool isolates:
All carbapenems (ertapenem, imipenem and meropenem) must be tested to screen for carbapenemase activity.</td></tr>
<tr><td>
<table>
<tr><th>If:</th><th>Then:</th></tr>
<tr><td>ertapenem S
and
imipenem S
and
meropenem S</td><td>• Refer to susceptibility reporting chart</td></tr>
<tr><td>ertapenem I/R
and
imipenem S
and
meropenem S</td><td>• Consult Microbiologist
• Add comment:
“This organism may produce an inducible carbapenemase. Susceptible carbapenems should be used with caution.” (21378)</td></tr>
<tr><td>imipenem I/R
or
meropenem I/R
Note 1</td><td>• Consult Microbiologist regarding the need to send for carbapenemase gene testing.
• If erta, imi or mero S add comment:
“This organism may produce an inducible carbapenemase. Susceptible carbapenems should be used with caution.” (21378)</td></tr>
</table>
</td></tr>
<tr><td>The carbapenemase produced in Aeromonas spp. may be inducible. Although ertapenem and meropenem have better activity than imipenem, imipenem may be better at detecting carbapenemase activity.</td></tr>
<tr><td>Note 1: I/R VITEK2 imipenem and meropenem results are not recommended due to a card limitation. If imipenem or meropenem I/R, confirm results by disc diffusion prior to reporting of results.</td></tr>
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Interpretation

For Etest, report actual MIC result. For interpretation (S, I, or R) report according to the nearest higher doubling dilution **(Appendix 1)**.

Use **CLSI** interpretive document for **Aeromonas spp.**

For ciprofloxacin – Refer to Special Considerations.