

DENVER® ASCITES SHUNT

Successful Shunting

Practical Techniques for Long-Term Effectiveness

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Pre- and Peri-Operative Issues and Techniques

Ascitic Fluid

Drain at least half the fluid. Consider replacing part of the drained volume with saline or other appropriate solution.

Value:

- ✓ Removes and dilutes pro-coagulants and fibrin split products from cirrhotic ascites.
- ✓ Reduces cellular debris.
- ✓ Reduces volume.
- ✓ Reduces risk of clinical DIC.
- ✓ Reduces risk of fluid overload.

Venous Catheter

- 1) Place tip at atrial-cavo junction.
- 2) Insure a smooth, non-kinked path.
- 3) Wipe with a heparin solution just prior to insertion into vein.
- 4) Secure ligatures firmly without reducing the catheter's ID.

Value:

- ✓ Eliminates early occlusion due to obstructed fluid pathway.
- ✓ Reduces risk of late occlusion due to fibrin sheath formation.
- ✓ Reduces risk of venous catheter tip thrombosis.
- ✓ Reduces risk of SVC thrombosis.

Antibiotics

- 1) Administer broad spectrum antibiotics.
- 2) Irrigate incision sites with antibiotic solution.

Value:

- ✓ Reduces risk of infection.
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Early Post-Operative Management and Techniques

Monitoring

Monitor hemodynamic status and blood values regularly until the patient has reached a stable circulatory status.

Value:

- ✓ Provides for evaluation of the level of coagulopathy and hemodilution.

Patient Position

Position the patient to control flow of the ascitic fluid:

Supine: Maximum flow of ascites into the venous circulation.

Partially Sitting Up: Reduced flow of ascites.

Full Upright Sitting: Further reduces or stops flow.

Value:

- ✓ Reduces risk of clinical DIC.
- ✓ Reduces risk of fluid overload.

Drug Administration

- 1) Diuretics as appropriate.
- 2) Pain medication as appropriate.
- 3) Consider possible mini-heparin or enteric aspirin for patients with viscous or fibrinous fluid.

Value:

- ✓ Aids in the resolution of ascites.
 - ✓ Increases patient comfort.
 - ✓ Reduces risk of early shunt occlusion.
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Long-Term Maintenance Issues and Techniques

Pumping the Shunt

For long-term patency the shunt should be properly pumped on a daily basis.

Proper Pumping Technique:

- 1) Lie down in a supine position.
- 2) Firmly grasp pump chamber between thumb and middle finger.
- 3) Firmly and completely compress the chamber with the index finger of the other hand.
- 4) Slowly release the compression of the chamber.
(Important: with single valve shunts, percutaneously occlude the venous catheter during pump chamber release.)
- 5) Repeat the pumping sequence 20 times.

Regular, Daily Schedule:

- 1) Pump the shunt 20 times in the morning.
- 2) Pump the shunt 20 times in the evening.

Value:

- ✓ Flushes fluid through the shunt.
 - ✓ Twenty consecutive compressions provides an exchange of fluid through the pump chamber.
 - ✓ Limits the accumulation of fibrin and other debris within the shunt.
 - ✓ Helps avoid the formation of an occlusive fibrin sheath at the venous tip.
 - ✓ Helps avoid late occlusion due to thrombus formation.
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Occlusion Issues and Resolution Techniques

Peritoneo-venous shunting has been cited in the literature* as providing several physiologic benefits:

- *Increases intravascular and effective blood volume.*
- *Retains nutrients and improves nutritional status.*
- *Increases renal blood flow.*
- *Increases diuresis.*
- *Relieves massive, refractory ascites.*
- *Results in weight loss and girth reduction.*
- *Improves mobility & respiration.*

And more specifically in cirrhotic patients:

- *Increases natriuretic response to diuretics.*
- *Reduces activity of the renin and angiotensin system.*
- *Reduces sodium retention.*

This document is intended as a reference guide for use with the Denver Ascites Shunt.

**References available from:*

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Determine Location of the Occlusion:

- 1) Place the patient in a supine position.
- 2) Pump the shunt according to the proper technique.

If the pump chamber is rigid and resists compression, the occlusion is within either the pump chamber or the venous catheter.

If the pump chamber compresses readily but does not refill and resume its normal shape, the occlusion is within the peritoneal catheter.

- 3) Consider performing a shuntogram.
- 4) Consider using Doppler ultrasound.

Options for Resolving Venous Catheter Occlusions:

- 1) Firmly pump the shunt several times.
- 2) Replace the venous catheter.
- 3) Reposition the venous catheter.
- 4) Replace shunt.
- 5) Consider thrombolytic therapy.

Options for Resolving Pump Chamber Occlusions:

- 1) Firmly pump the shunt several times.
- 2) Replace the venous catheter.
- 3) Replace shunt.
- 4) Consider thrombolytic therapy.

Options for Resolving Peritoneal Catheter Occlusions:

- 1) Reposition catheter.
- 2) Replace catheter.