Denver® ascites shunts

For patients with refractory ascites
For patients with refractory ascites, consider peritoneovenous shunting (PVS) with the Denver® shunt.

A specially designed silicone medical device consisting of a pump chamber with two catheters, the Denver shunt transfers fluid from the peritoneum to the central circulatory system. This allows the patient to maintain the critical protein and nutrients in the peritoneal fluid, while maintaining normal flow through vital organs.

**Benefits of PVS:**

- Retains nutrients
- Increases renal blood flow
- Improves mobility and respiration
- Relieves massive, refractory ascites
- Increases effective blood volume
- Increases diuresis

**Silique™ surface treatment**

Denver shunts now include the Silique surface treatment, which enhances the properties of our silicone shunts:

- Smoother, more uniform surface
- Less tacky
- Lower coefficient of friction

This is the same type of surface treatment used on devices such as infusion ports, central venous catheters, I.V. catheters and hemodialysis products.
Compressible pump chamber
The soft pump chamber lies subcutaneously over the lower ribs, providing a convenient and comfortable location for manual pumping. While ascitic fluid flows spontaneously, manual pumping flushes fluid through the shunt, helping avoid the buildup of proteinaceous material.
• Helps avoid occlusion
• Provides a means to determine patency

Miter valves
Specially designed silicone miter valves, located in the pump chamber, control the flow of fluid.
• Permit flow in only one direction
• Enable spontaneous flow when the pressure in the peritoneal cavity is 3 cm H₂O or higher than the central venous pressure
• Designed so the inner surface of the valves slide against one another when manually pumped, helping reduce buildup on the valves

Radiopaque-striped catheters
The entire length of the venous catheter and the fenestrated peritoneal catheters are striped with barium sulfate, permitting visualization under fluoroscopy.
Valve options
Denver shunts give you the flexibility to determine the best means to control the flow of ascitic fluid by offering single- and double-valved pump chambers. Ascitic fluid viscosity and/or the amount of formed elements in the fluid should be of primary consideration when deciding if a single- or double-valved shunt is to be used.

Double-valved shunts
Double-valved shunts will meet the needs of the majority of your patients. They provide ample flow rates and have the added feature of a second valve. The second valve serves as a check valve that helps prevent reflux of blood into the venous catheter when the shunt is manually pumped.

Single-valved shunts
Single-valved shunts offer less obstruction to flow, and therefore should be considered when the ascitic fluid is highly viscous. They also provide the highest flow rates.

In lieu of a check valve, the venous tubing just above the pump chamber should be compressed in an alternating fashion when pumping the pump chamber. See Directions for Use for detailed pumping instructions.

Catheter options
While the peritoneal end of the catheter is always 15.5 Fr, you have two options for the venous catheter: 15.5 Fr (for internal jugular, subclavian or peritoneo-saphenous placement) or 11.5 Fr (designed for subclavian placement). Patient anatomy and procedural preference should determine which catheter size will be used.

Flow rate consideration
Spontaneous flow occurs when the pressure in the peritoneal cavity is approximately 3 cm H₂O higher than the central venous pressure. The range of flow for each shunt model is based upon a pressure head of 10 cm H₂O.

<table>
<thead>
<tr>
<th>Catheter size</th>
<th>Double valve</th>
<th>Single valve</th>
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</thead>
<tbody>
<tr>
<td>11.5 Fr.</td>
<td>20-30 mL/min</td>
<td>30-40 mL/min</td>
</tr>
<tr>
<td>15.5 Fr.</td>
<td>25-40 mL/min</td>
<td>40-55 mL/min</td>
</tr>
</tbody>
</table>

Venous catheter flow rate

See page 7 for associated product codes.
The Denver shunt may be placed via the internal jugular or subclavian route. It is also cleared for peritoneo-saphenous placement. Historically, a surgical approach was used. However, over the past decade, percutaneous placement has become more common to minimize patient trauma and procedural risk. Denver shunt placement using the percutaneous technique is a minimally invasive procedure.

**Procedural options:**
The Denver shunt offers procedural options to meet varying physician preferences.

**Internal jugular placement**

**Subclavian placement**
If the Denver shunt is new to you, isn’t it time you consider it for your patients with refractory ascites?

Successful physician and patient experience with the Denver shunt has continued to grow over the past decades, all over the world.

Peritoneovenous shunting may be the best option for your patient.

**Consider PVS:**
- For both malignant and non-malignant ascites
- As an alternative to conventional (repeated) paracentesis procedures
- For patients awaiting liver transplant
- As a potential alternative to transjugular intrahepatic portasystemic shunts (TIPS)

Here’s what recent studies say about the success of PVS:

“*Percutaneous placement of peritoneovenous shunt is a safe, fast and inexpensive procedure, extremely useful in resolution of refractory ascites, reducing symptoms and allowing effective palliation with a great improvement in quality of life.*”¹

*European Radiology*, 2002

“Our results suggest that peritoneovenous shunting might be beneficial in patients with refractory ascites waiting for liver transplant and could prevent postoperative acute renal failure.”²

*American Journal of Transplantation*, 2005

“*Peritoneovenous shunt placement provides an effective treatment option for patients with refractory malignant ascites in advanced cancer, and yields a higher likelihood of discharge compared with conventional paracentesis.*”³

*Journal of Gastroenterology and Hepatology*, 2007

If you’ve heard of the Denver shunt or tried it in the past, it’s time to take another look.
Denver Shunt Ordering Information

<table>
<thead>
<tr>
<th>Denver Ascites Shunts</th>
<th>Denver PAK (Percutaneous Access Kits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. no.</td>
<td>Description</td>
</tr>
<tr>
<td>42-2000</td>
<td>Denver ascites shunt: Double-valved, 15.5 Fr venous catheter</td>
</tr>
<tr>
<td></td>
<td>Flow rate: 25 to 40 mL/min</td>
</tr>
<tr>
<td>42-2005</td>
<td>Denver ascites shunt: Single-valved, 15.5 Fr venous catheter</td>
</tr>
<tr>
<td></td>
<td>Flow rate: 40 to 55 mL/min</td>
</tr>
</tbody>
</table>

Optional Components

- Percutaneous lead introducer set, 12 Fr with guidewire (10383-006)
- Percutaneous lead introducer set, 16 Fr with guidewire (10383-010)
- Tunneler, 18 Fr, 15" (42-3100) (for initial placement or revision)

Flow rate: 25 to 40 mL/min for the double-valved shunt and 40 to 55 mL/min for the single-valved shunt.

For Denver shunt revisions, the following components are available:

<table>
<thead>
<tr>
<th>Replacement Components</th>
<th>Required Component for All Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. no.</td>
<td>Description</td>
</tr>
<tr>
<td>42-2321</td>
<td>Venous catheter, 15.5 Fr, 60 cm</td>
</tr>
<tr>
<td>42-2322</td>
<td>Peritoneal catheter, 15.5 Fr, 27 cm</td>
</tr>
<tr>
<td>42-2521</td>
<td>Venous catheter, 11.5 Fr, 60 cm</td>
</tr>
</tbody>
</table>

Optional Component

- Percutaneous lead introducer set, 12 Fr with guidewire (10383-006)
- Percutaneous lead introducer set, 16 Fr with guidewire (10383-010)

For more information or to place an order, contact your CareFusion Interventional Specialties Sales Representative or call 800.653.6827.
References:

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