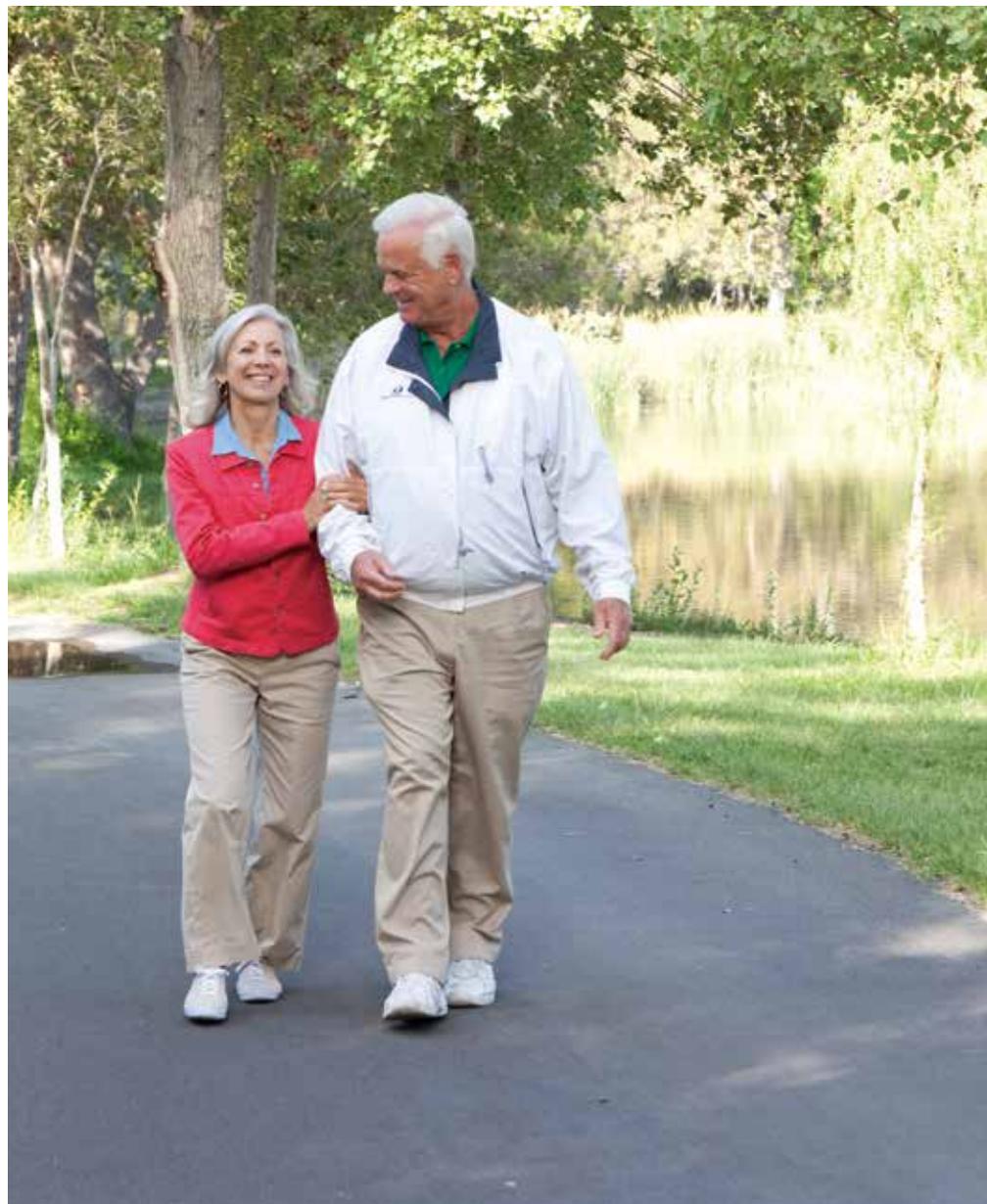
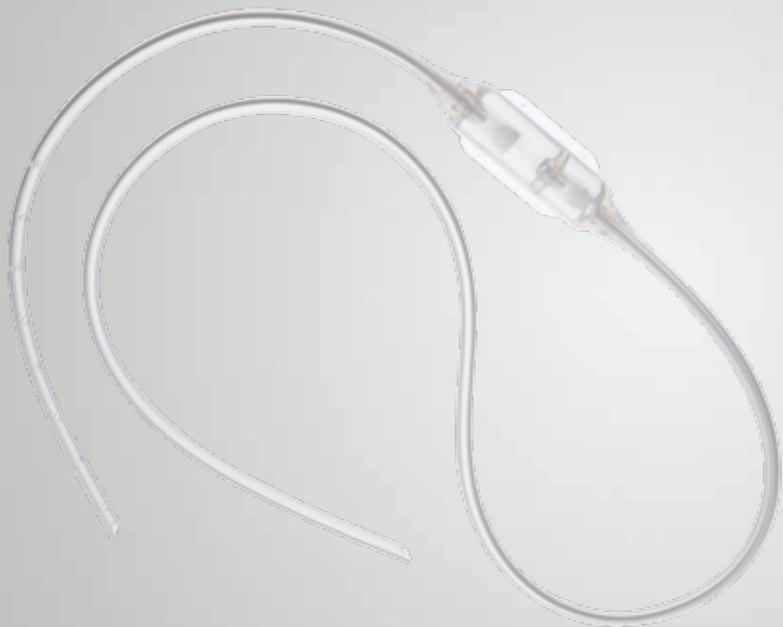


# Denver<sup>®</sup> ascites shunts

Effectively manage refractory ascites



## 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 peritoneal space to the circulatory system. This allows the patient to maintain the critical protein and nutrients in the peritoneal fluid, and 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

Successful physician and patient experience with the Denver shunt has continued to grow over the past decades, in the U.S. and internationally. For patients with refractory ascites, consider peritoneovenous shunting with the Denver shunt.

### PVS has been shown to be beneficial:

- For both malignant and non-malignant ascites
- As an alternative to conventional (*repeated*) paracentesis procedures
- For patients awaiting liver transplant



*“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.**”<sup>1</sup>*

*European Radiology, 2002*

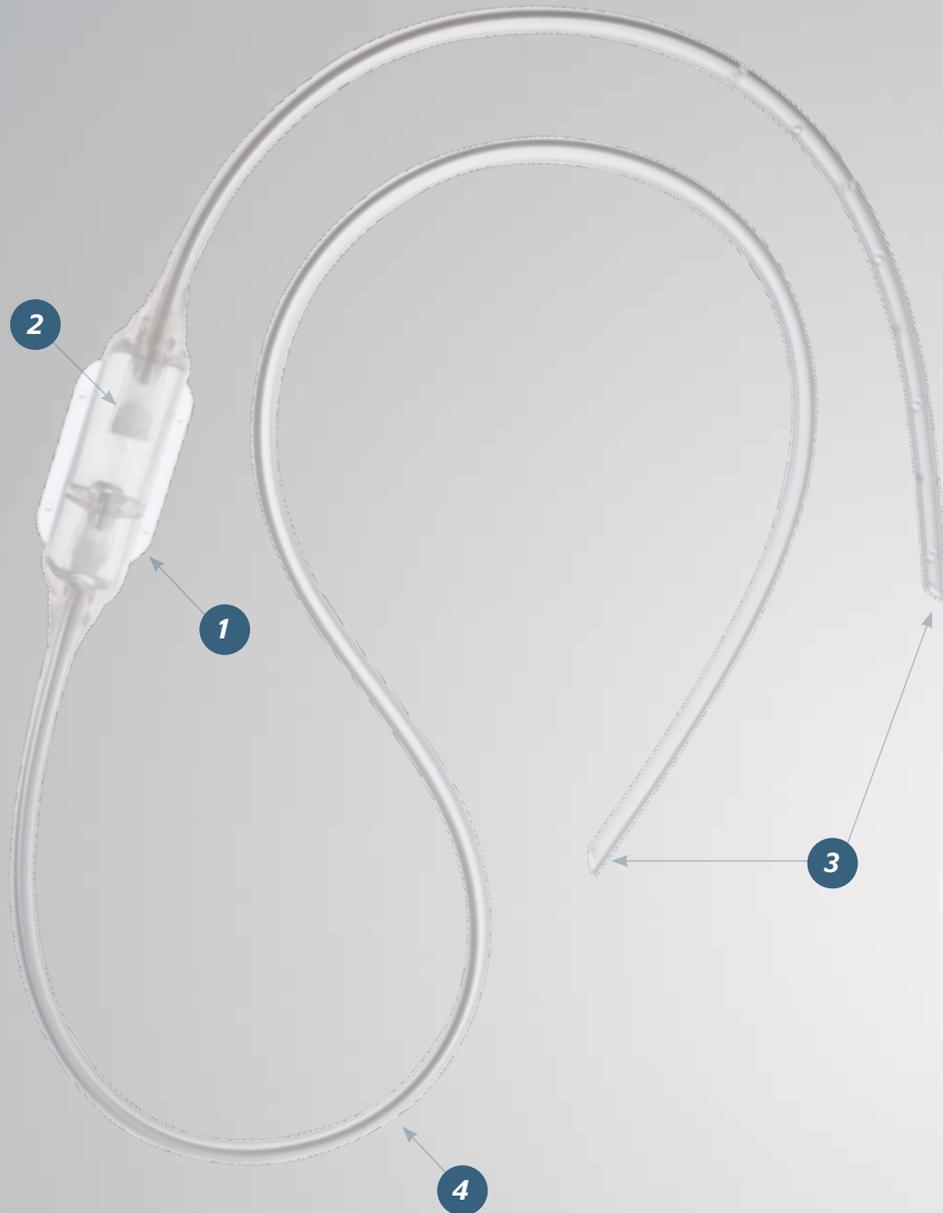
*“Our results suggest that peritoneovenous shunting might be beneficial in patients with refractory ascites waiting for liver transplant and could prevent **postoperative acute renal failure.**”<sup>2</sup>*

*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.”<sup>3</sup>*

*Journal of Gastroenterology and Hepatology, 2007*

## Double-valved Denver ascites shunt



### 1 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. The compressible pump chamber:

- Is designed to help prevent occlusion
- Provides a means to determine patency

### 2 Miter valves

Specially designed silicone miter valves, located in the pump chamber, control the flow of fluid by:

- Permitting flow in only one direction
- Enabling spontaneous flow when the pressure in the peritoneal cavity is 3 cm H<sub>2</sub>O higher than the central venous pressure
- Allowing the inner surface of the valves to slide against one another when manually pumped, helping reduce buildup

### 3 Radiopaque-striped catheters

The entire length of the venous catheter and the fenestrated peritoneal catheters are striped with barium sulfate, permitting visualization under fluoroscopy.

### 4 Silique® coating surface treatment

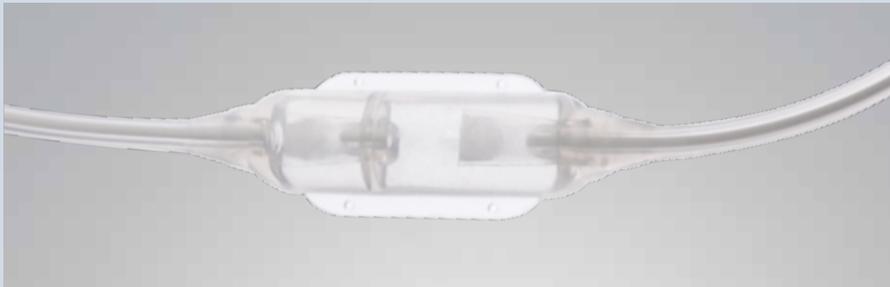
Denver shunts now include the Silique coating surface treatment, which enhances the following properties of our silicone shunts:

- Smoother, more uniform surface
- Less tackiness
- Lower coefficient of friction
- Silique coating offers the same type of surface treatment used on devices such as infusion ports, central venous catheters, intravenous (IV) catheters and hemodialysis products.

# Flexible product options

## 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 a primary consideration when deciding if a single- or double-valved shunt is to be used.



### Double-valved shunts

Double-valved shunts meet the needs of most patients. They provide ample flow rates and a second valve. The second valve serves as a check valve that helps prevent the 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 should be considered when the ascitic fluid is highly viscous. They also provide the highest flow rates. In the absence of a check valve, an alternate pumping method is recommended. See the directions for use for detailed pumping instructions.

## Catheter options

While the peritoneal end of the catheter is always 15.5 Fr, two options are available 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 catheter size.

### Flow rate consideration:

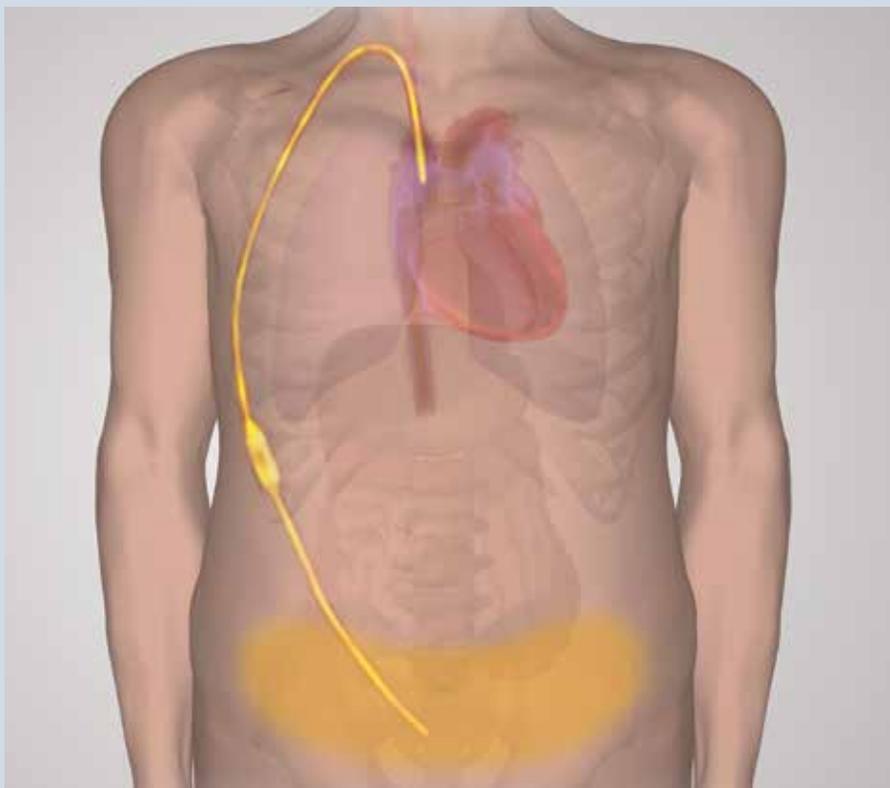
Spontaneous flow occurs when the pressure in the peritoneal cavity is approximately 3 cm H<sub>2</sub>O higher than the central venous pressure. The range of flow for each shunt model is based on a pressure head of 10 cm H<sub>2</sub>O.

Venous catheter flow rate		
Catheter size	Double valve	Single valve
11.5 Fr	20–30 mL/min	30–40 mL/min
15.5 Fr	25–40 mL/min	40–55 mL/min

## Procedural options

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, during the past decade, percutaneous placement has become more common to minimize patient trauma and procedural risk. Denver shunt placement with the percutaneous technique is a minimally invasive procedure.

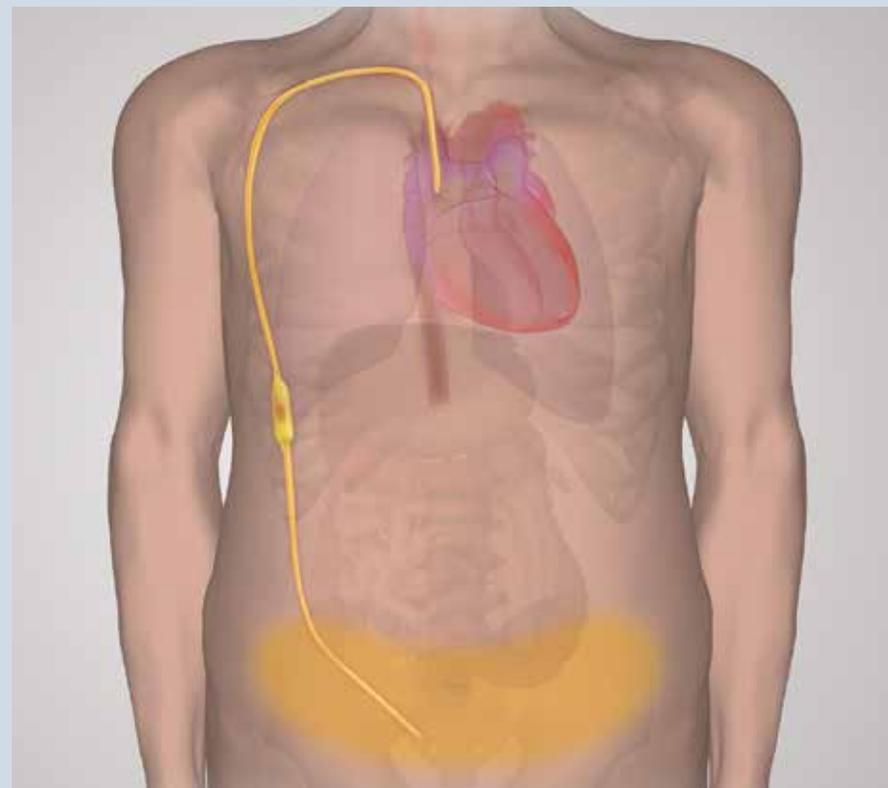


### Internal jugular placement

#### Recommended products:

42-2020 Denver shunt 15.5 Fr PAK\* double-valved shunt

42-2025 Denver shunt 15.5 Fr PAK, single valved shunt



### Subclavian placement

#### Recommended products:

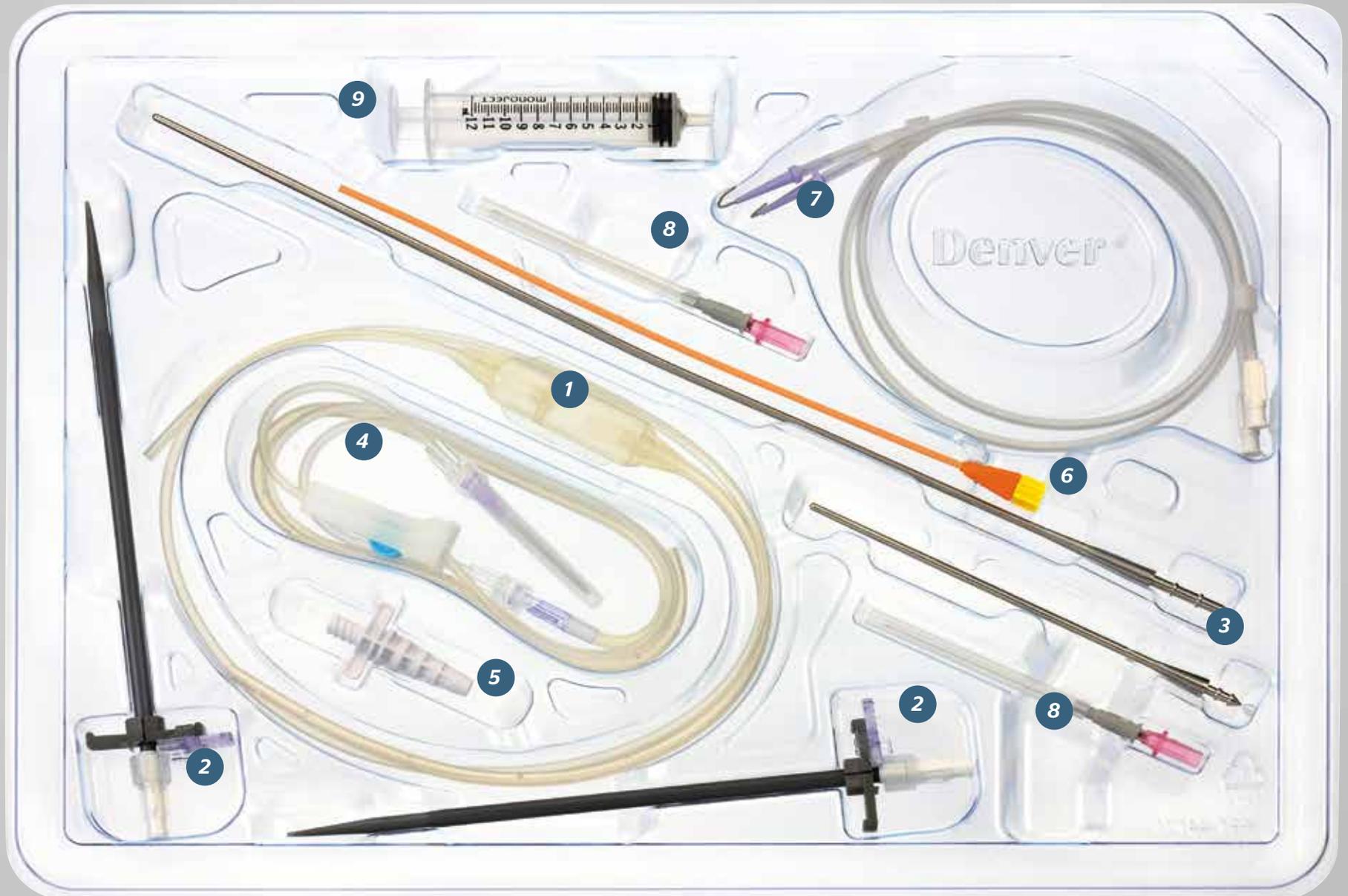
42-2050 Denver shunt 11.5 Fr PAK, double-valved shunt

42-2055 Denver shunt 11.5 Fr PAK, single-valved shunt

\*Percutaneous access kit

## Percutaneous access kit (PAK) for 15.5 Fr shunt

Denver 15.5 Fr shunts are now available in a procedure tray containing updated components for percutaneous placement:  
Denver shunt 15.5 Fr PAK with double valved shunt (42-2020), and single valved shunt (42-2025).



**1 Denver ascites shunt (double or single valve) with 15.5 Fr. venous and peritoneal limbs**

**2 Valved 16 Fr peel-away introducer (qty. 2)**

Helps prevent air from entering and fluid from leaking during placement. Also available with the super-stiff J-tip guidewire, introducer needle with sheath and 12 mL syringe in set 42-4016. See the back page for ordering information.

**3 FastTrack tunneler set**

- Malleable, stainless steel design that allows for greater control during tunneling
- Long, barbed end that minimizes the risk of shunt detachment while tunneling
- Narrow tip that facilitates tunneling through tissue
- 15" tunneler and 6" tunneler that allow for a two-step tunneling procedure
- Both tunnelers are 10 Fr (19 Fr at the widest point)

**4 PrepCentesis drainage catheter**

Facilitates ascites drainage prior to shunt placement. The set includes a fenestrated catheter, a drainage line with roller clamp, and your choice of vacuum needle or 5-in-1 adapter.

**5 5-in-1 wall suction adapter (for use with PrepCentesis drainage catheter).**

**6 Catheter insertion stylet**

To ease catheter insertion into the introducer (for use with PrepCentesis drainage catheter).

**7 Super-stiff J-tip guidewire (.038" x 60 cm, qty. 2)**

**8 18 G introducer needle with sheath (qty. 2)**

**9 Syringe (12 mL)**



Valved peel-away introducer



FastTrack tunneler set

## Denver shunt ordering information

Denver ascites shunt PAKs ( <i>percutaneous access kits</i> )		
Cat. no.	Description	
<b>Denver 15.5 Fr PAKs</b>		
42-2020	Denver 15.5 Fr PAK: Doubled-valved, 15.5 Fr venous catheter Flow rate: 25–40 mL/min	<b>Components included:</b> <ul style="list-style-type: none"> <li>• Ascites shunt with 15.5 Fr venous catheter and 15.5 Fr peritoneal catheter</li> <li>• 16 Fr valved peel-away introducer (<i>qty. 2</i>)</li> <li>• Catheter insertion stylet</li> <li>• PrepCentesis drainage catheter (<i>drainage line, vacuum needle and 5-in-1 adapter</i>)</li> <li>• Super-stiff J-tip guidewire (.038" x 60 cm, <i>qty. 2</i>)</li> <li>• Syringe (12 mL)</li> <li>• 18 G introducer needle with plastic sheath (<i>qty. 2</i>)</li> <li>• FastTrack tunneler set (1 each of 15" and 6" 10 Fr stainless steel tunnelers)</li> </ul>
42-2025	Denver 15.5 Fr PAK: Single-valved, 15.5 Fr venous catheter Flow rate: 40–55 mL/min	
<b>Denver 11.5 Fr PAKs</b>		
42-2050	Denver PAK: Double-valved shunt, 11.5 Fr venous catheter Flow rate: 20–30 mL/min	<b>Components included:</b> <ul style="list-style-type: none"> <li>• Ascites shunt with 11.5 Fr venous catheter and 15.5 Fr peritoneal catheter</li> <li>• 12 Fr peel-away introducer</li> <li>• 16 Fr peel-away introducer</li> <li>• J-tip guidewire (.038" X 45 cm, <i>qty. 2</i>)</li> <li>• Syringe (12 mL)</li> <li>• 18 G needle (<i>qty. 2</i>)</li> <li>• 15 Fr, 13" tunneler</li> </ul>
42-2055	Denver PAK: Single-valved shunt, 11.5 Fr venous catheter Flow rate: 30–40 mL/min	

## Denver shunt revision components:

Replacement components		
Cat. no.	Description	
42-2321	Venous catheter, 15.5 Fr, 60 cm	
42-2322	Peritoneal catheter, 15.5 Fr, 27 cm	
42-2521	Venous catheter, 11.5 Fr, 60 cm	
42-3019	Nylon tubing connector ( <i>required if using any of the above catheter limbs</i> )	
Procedure components		
42-4016	Valved introducer set with super-stiff guidewire, 16 Fr	<b>Components included:</b> <ul style="list-style-type: none"> <li>• Super-stiff J-tip guidewire (.038" x 60 cm)</li> <li>• Valved peel-away introducer</li> <li>• 18 G introducer needle with plastic sheath</li> <li>• Syringe (12 mL)</li> </ul>
42-4012	Valved introducer set with super-stiff guidewire, 12 Fr	
42-3500	FastTrack tunneler set (1 each of 15" and 6" 10 Fr stainless steel tunnelers)	

Contact your Interventional Specialties sales representative. Call Customer Service at **800.323.9088** or visit [carefusion.com/Denver](http://carefusion.com/Denver) to place an order or for more information.

1 Orsi, F., Grasso, R., Bonomo, G., Monti, C. et al. Percutaneous peritoneovenous shunt positioning: technique and preliminary results. *European Radiology*, 2002, 12:1188–1192. 2 Dumortier, J., Pianta, E., Le Derf, Y., Bernard, P. et al. Peritoneovenous shunt as a bridge to liver transplantation. *American Journal of Transplantation*, 2005, 5:1886–1892. 3 Seike, M., Maetani, I., Sakai, Y. Treatment of malignant ascites in patients with advanced cancer: Peritoneovenous shunt vs. paracentesis. *Journal of Gastroenterology and Hepatology*, 2007, 22:2161–2166.

CareFusion  
Waukegan, IL

[carefusion.com](http://carefusion.com)

