Central venous access in conscious mice for repeated blood sampling in pharmacokinetic studies is achieved using chronically implanted jugular vein catheters (JVCs). One factor that affects catheter patency is the catheter maintenance schedule which sets practical limits on its uses. We have previously shown that the use of transcutaneous buttons kept the catheters patent longer than the standard externalized catheters (Mallette et al. Journal of the American Association for Laboratory Animal Science, Vol 56, No 5, P65, 2017).

We conducted a study to determine the duration of blood collection patency and infusion-only patency of JVCs attached to transcutaneous buttons in mice without catheter maintenance. All catheters remained patent for infusion, but not blood withdrawal through week 5 post surgery. This data showed that without catheter maintenance, bidirectional catheter patency for blood collection is relatively short-term in comparison to catheter patency for infusion-only JVCs attached to transcutaneous buttons in mice.

**Definitions:**
- Fully Patent: Successful blood withdrawal on first attempt
- Patent on Flush: Successful blood withdrawal after infusion of saline
- Partially Patent: Unsuccessful blood withdrawal but patent for infusion
- Non-Patent: Unsuccessful blood withdrawal and infusion failure

**Animals**

50 CD-1® adult male mice (Charles River Laboratories, Raleigh, NC), weighing between 37 - 39 grams, were randomly assigned to five groups (n = 10 each). Mice were anesthetized and surgically instrumented. Following surgery, mice were singly housed in polycarbonate cages, maintained at 21 ± 2 °C with relative humidity of 30 - 70% and a 12:12 hour light/dark cycle, and given commercially prepared food and water ad libitum. All procedures were conducted in accordance with recommendations set forth in the Guide for the Care and Use of Laboratory Animals (National Research Council, 2011) and performed in an AAALAC International-accredited facility.

**Surgical Procedure**

Animals were injected intraperitoneally with ketamine (75 mg/kg) and xylazine (6 mg/kg), subcutaneously with buprenorphine (0.05 mg/kg), and implanted with a jugular vein catheter (JVC) attached to a transcutaneous button (Instech model # VABM18/25). The skin overlying the right jugular vein and intrascapular area were shaved and prepared using chlorhexidine and alcohol. A cranial-caudal incision was made to expose the right jugular vein and a dorsal intrascapular incision to place the button. The skin incision was closed with a U-tie using monofilament suture. The catheter and button were locked with heparinized (500 IU/mL) 50% dextrose. Animals were monitored closely and recovered in a cage with supplementary heat before they were returned to their home cages.

Animals were manually restrained, button port accessed using an injector (Instech model # PNP3M) attached to a 1 cc syringe. The catheter was aspirated to determine the ability to withdraw blood. If flush solution failed to infuse, a second aspiration was attempted to withdraw blood. Patency was assessed using chronically implanted jugular vein catheters attached to externalized catheters (Mallette et al. Journal of the American Association for Laboratory Animal Science, Vol 56, No 5, P65, 2017).

Animals were clinically healthy throughout the study and gained body weight normally.

**Table 1. Summary of blood withdrawal and infusion patency without weekly maintenance.**

<table>
<thead>
<tr>
<th>Number of animals</th>
<th>Patency test</th>
<th>Blood withdrawal</th>
<th>Infusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2 weeks after surgery</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>3 weeks after surgery</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>4 weeks after surgery</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>5 weeks after surgery</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Blood withdrawal patency was 100% up through week 3 post surgery without catheter flushing maintenance. Patency rates decreased to 90% and 60% at week 4 and week 5, respectively. All catheters remained patent for infusion, but not blood collection through week 5 post surgery. This data shows that bidirectional catheter patency for blood collection is relatively short-term in comparison to catheter patency for infusion only of JVCs attached to transcutaneous buttons in mice without catheter maintenance. This should be a key consideration when planning studies. Depending on the intended use of the model, resource allocation for catheter maintenance may or may not be required.

**Summary and Conclusions**

Animals were clinically healthy throughout the study and gained body weight normally. Patency rates decreased to 90% and 60% at week 4 and week 5, respectively. All catheters remained patent for infusion, but not blood collection through week 5 post surgery. This data shows that bidirectional catheter patency for blood collection is relatively short-term in comparison to catheter patency for infusion only of JVCs attached to transcutaneous buttons in mice without catheter maintenance. This should be a key consideration when planning studies. Depending on the intended use of the model, resource allocation for catheter maintenance may or may not be required.