INTRODUCTION AND OBJECTIVE:
Guidewires have become a standard tool of the surgical urologist. Guidewires aid the urologist in gaining access to the urinary tract and provide a path for the ureteroscope and other instrumentation such as a ureteral catheter, balloon dilator and stents. “Guidewires must have a low coefficient of friction to negotiate up the ureter successfully and allow multiple passages of instrumentation over them”.¹ The type of surface coating and the durability of that coating will impact the Coefficient of Friction (COF). This paper summarizes the COF results of in-vitro lab testing conducted by Bard Medical Division of several commercially available guidewires after they have been subjected to a simulated use model.

METHOD:
Coefficient of Friction (COF) is defined as the ratio of two forces. The first is the frictional force or the resisting force that arises when a surface of one substance slides over an adjoining surface. The secondary force is the gravitational force, which is pushing down on the two surfaces. To determine the COF, a standardized COF test fixture is utilized. The test fixture consists of a water trough, an automated platform and a Chatillon device that measures the force required to move the platform across the guidewire. For this test, a guidewire is secured in a water bath that is equilibrated to 37° C ± 3° C. The automated platform is placed over the guidewire and attached to the Chatillon. Once the Chatillon is zeroed, the test is initiated. The platform moves at a predefined rate and length. During the movement, force data is automatically recorded on a computer.

For this study, the COF was tested after the guidewires were put through a simulated use model. The model is composed of a water bath that has a guidewire inserted into a ureteral 6 Fr. catheter. The ureteral catheter is passed through a tortuous pathway. The guidewire is attached to an automated mechanism that moves the wire in and out of the ureteral catheter. It takes approximately 12 seconds per cycle. Each guidewire is cycled 10 times. Once the 10 cycles are completed COF testing is done. Following are the commercially available guidewires used in the study:

- (20) Terumo Glidewire® 0.035in straight, regular shaft guidewires, PN# 66301001
- (20) Terumo Glidewire® 0.038in straight, regular shaft guidewires, PN# 66301021
- (20) Cook HiWire® 0.035in straight, regular shaft guidewires, PN# HW035150
- (20) Cook HiWire® 0.038in straight, regular shaft guidewires, PN# HW038150
- (30) BARD® NiCore® 0.035in straight, regular shaft guidewires, PN# 150NFS35
- (30) BARD® NiCore® 0.038in straight, regular shaft guidewires. PN# 150NFS38
RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>BARD® NiCore® Guidewire</th>
<th>Terumo Glidewire® Guidewire</th>
<th>Cook HiWire® Guidewire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>0.035”</td>
<td>0.035”</td>
<td>0.035”</td>
</tr>
<tr>
<td>Number</td>
<td>29</td>
<td>20</td>
<td>20</td>
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<tr>
<td>Ave COF</td>
<td>0.028</td>
<td>0.025</td>
<td>0.060</td>
</tr>
<tr>
<td>Std Dev.</td>
<td>0.006</td>
<td>0.003</td>
<td>0.009</td>
</tr>
</tbody>
</table>

CONCLUSION:

In this study, the BARD® NiCore® Guidewire has a similar COF as the Terumo Glidewire® guidewire and a lower COF than the Cook HiWire® guidewire after simulated use testing.

REFERENCES: