HOW TO USE THIS ARTICLE
To understand the vessel security and to determine the time required to achieve independent security after ligation with an absorbable suture or absorbable clip.

METHODS
Fifty-nine New Zealand albino rabbits were randomly divided into two groups. In each group, all rabbits had both a carotid artery and the contralateral external jugular vein ligated with either a Vicryl™ or Poly Surgiclip™ clip applier and the vessels transected. The ultimate security of ligated vessels was quantitated immediately after ligation for 12 animals. For the other 47 animals, the clips or sutures were moved after 1, 2, 4, 7, or 14 days, and an assessment of vessel security was performed.

RESULTS
- Clip-ligated arteries had a statistically higher value of independent security than suture-ligated arteries at all time periods up until day 14. (Table 1)
- Clip-ligated arteries were physiologically secure after 1 day.
  - Suture-ligated arteries failed at a mean pressure of 88 mm Hg even after 4 days.
- Clip-ligated arteries achieved maximum security at 7 days. For suture-ligated arteries it took up to 14 days.
- Ligated veins showed a similar trend (Table 1).
  - Veins ligated by a clip had a mean security value of 13 mm Hg at 2 days.
  - Suture-ligated veins had a mean security value of 46 mm Hg, even after 4 days.
  - Both methods of ligation produced similar security values at 7 days.
- Microscopic analysis showed suture-ligated arteries caused a circumferential constriction to a very small circular area. Clip-ligated arteries showed a linear compression.
  - At 2 days, suture-ligated arteries showed a severed muscular layer of the artery at the constricted site.
  - At 7 days, results were still the same.
- At 2 days, the clip-ligated arteries showed secure approximation of the vessel walls.
  - At 7 days the necrotic media seen at day 2 had been replaced by granulation tissue.

Table 1: Independent Security of Vessels after Ligation (mm Hg)

<table>
<thead>
<tr>
<th>Time after Ligation (days)</th>
<th>ARTERIES</th>
<th>VEINS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clips</td>
<td>Suture</td>
</tr>
<tr>
<td>1</td>
<td>171±46</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>585±180</td>
<td>18±4</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>88±49</td>
</tr>
<tr>
<td>7</td>
<td>1,000±0</td>
<td>569±130</td>
</tr>
<tr>
<td>14</td>
<td>1,000±0</td>
<td>976±30</td>
</tr>
</tbody>
</table>

AUTHORS’ CONCLUSIONS
The use of absorbable clips for vessel ligation provides a quicker attainment of independent vessel security compared to absorbable sutures.

CITATION:

PRODUCT CATEGORY: Clip Appliers
PRODUCT DISCUSSED: Absorbable Suture/Absorbable Clip