Rationale: The use of the femoral vein for parenteral nutrition (PN) is relatively contraindicated, because of common belief it’s associated with a high risk of contamination at the exit site at the groin, leading to sepsis and a high risk of venous thrombosis. When veins of upper part of the body became occluded, the femoral access is the first choice for long term PN, but such situation is now recognised as indication for intestinal transplantation \(^1\). The method of tunnelization of Broviac’s catheter introduced through saphenous vein has been described with tunnel exit opening directed up \(^2\). However, this could predispose to exit site infection. The aim was to evaluate safety of modified femoral venous access for HPN.

Methods: 20 from 962 HPN patients suffered from intestinal failure presented complete occlusion of upper vena cava on admission (n = 8) or during HPN (n =12 ), confirmed by phlebography and / or CT scan (Fig 1-3). 6,6 F Broviac catheter tunnelized to abdominal wall up for over 15-20 cm and then reversed, putting the cuff 5 cm down and exit site 2 cm lower, was inserted under fluoroscopy through femoral vein into right atrium (Fig 4-10). Exit site infection and central catheter related blood stream infection (CRBSI) rate was retrospectively analysed and compared with observed in the same patients when tunnelised upper vein access was used before occlusion of upper veins or after theirs recanalization.

Results: HPN was provided for total of 31 206 days through femoral and 20422 days through subclavian or jugular vein. Infectious complications are presented in table 1. Thrombosis of both femoral veins has occurred in 2 patients, upper veins recanalised after 3-12 years in 4 patients. Three catheters were or are used for 9, 9 and 14 years.

![Fig.1.2. Phlebography and CT scan (fig 3) shows thrombosis of upper caval vein](image1.png)

![Fig.4,5 - Femoral vein cannulated, tunnel created with tunneler and thread.](image2.png)

![Fig.6. Catheter tunnelized up and down. Fig 7. Green line shows tunnel, red – the vein.](image3.png)

![Fig 8 – Kinking iliac vein. Fig 9 – Reposition into LCV. Fig 10 – Final location in right atrium](image4.png)

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Femoral access</th>
<th>Jugular or subclavian access</th>
<th>RR</th>
<th>P</th>
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<tr>
<td>CRBSI</td>
<td>0.27</td>
<td>1.66</td>
<td>0.3631</td>
<td>P = 0.0061</td>
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<tr>
<td>Exit site infection</td>
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<td>0.097</td>
<td>1.01</td>
<td>P = 0.9837</td>
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<td>Tunnel infection</td>
<td>0.14</td>
<td>0.06</td>
<td>2.29</td>
<td>P = 0.3622</td>
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</table>

Conclusions:
1. Modified femoral access is safe.
2. The risk of thrombosis is low with systemic anticoagulation.
3. The reason for lower complications rate may be due to better catheter care performance with growing experience but also due to easier handling by the patients.

References: