Successful Stent implantation in Internal jugular vein with total occlusion by using Brockenbrough needle

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(Chief complain) Reduced right eyesight. Facial swelling and pain
(Present illness)

• 24yr-old: focal segmental glomerulonephritis
• 30yr-old: AVF in the left forearm. HD introduced.
• 31yr-old: Shunt failure. Another AVF in the right cubital fossa.
• 38yr-old: Venous pressure elevated. Angiography revealed the proximal left cephalic vein occlusion. She refused to undergo EVT. Severe swelling of the right arm deteriorated. 6 months later, Artificial bypass graft between the right subclavian vein and the jugular vein.
• Jun 2010: Reduced vision of the right eyesight, facial edema and pain at the AVF developed.
• Aug 2010: Angiography revealed total occlusion of the right jugular vein.
Venography in Aug 2010

Total occlusion in the right internal jugular vein just above SVC
Her appearance before EVT

Artificial graft
What happened to her?

- The jugular vein occlusion raised intraocular pressure which led to the deterioration of neovascular glaucoma. Intraocular pressure elevated to 30 mmHg.
- She was at risk for complete blindness because her left eyesight was already lost.
- In Sep 2010, We were asked to open CTO in the right jugular vein.

(Past history)
25yr-old: hearing disturbance
36yr-old: loss of her left eyesight due to fundal hemorrhage
39yr-old: GI bleeding due to gastric ulcer.
Total occlusion in the right internal jugular vein. No thrombus was observed.
In the first attempt, we failed to pass a guide wire through the CTO lesion even after very hard guide wires were used and IVUS guidance via femoral vein. There was very thick and hard membrane which looked like valve.
After about 2 weeks, we tried again. This time, we used a Brockenbrough needle to stick the membrane. We succeeded to put this needle into the proximal true lumen.
Second attempt EVT in Oct 2010

One Express LD stent (10/25mm) was deployed in the right jugular vein.
Serial change of Ocular pressure

mmHg


Stent implantation
CT 1yr after stent implantation
Discussion

• A common problem in the management of patients undergoing hemodialysis is central venous occlusive disease.
• Treatment options to date include balloon angioplasty, stent (bare metal or covered) and surgical bypass.
• However, all the available treatment options have poor long-term patency.
• Our case was very particular in terms of
  1. Complication of neovascular glaucoma which threatened her vision.
  2. Internal jugular vein occlusion developed 4 years after unusual artificial graft (arm fistula to jugular).
  3. Configuration of occlusion in the internal jugular vein was very characteristic; dome like figure: looked like valve.
Venous valve in subclavian and internal jugular veins: autopsy findings (n=100)

% Valves present : 97%
Distance to A : 5.2cm
Distance to B : 0.3cm

% Valves present : 99%
Distance to A : 6.4cm
Distance to B : 1.5cm

Structure of Venous Valves

<table>
<thead>
<tr>
<th>Valve structure</th>
<th>RS</th>
<th>RIJ</th>
<th>LIJ</th>
<th>LS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicuspid</td>
<td>94</td>
<td>85</td>
<td>77</td>
<td>91</td>
<td>347</td>
</tr>
<tr>
<td>Unicuspid</td>
<td>6</td>
<td>12</td>
<td>14</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>Absent</td>
<td>-1</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>100</td>
<td>100</td>
<td>101</td>
<td>402*</td>
</tr>
</tbody>
</table>

*Abbreviations: RS, LS, right and left subclavian, respectively; RIJ, LIJ, right and left internal jugular, respectively.

*Total is 402 rather than 400 because two valves were present in two veins (1 RS and 1 LS).
Possible cause of narrowing

Unusual artificial graft to internal jugular vein after occlusion of subclavian vein

Amount of blood flow and speed in the right jugular vein.

Shear stress

Valve in the right internal jugular vein degenerated and got thick

Occlusion
• We encountered the hemodialysis patient who were about to lose her vision because of neovascular glaucoma.

• Ocular pressure dramatically declined after opening of occlusion in her right internal jugular vein.

• Brockenbrough catheter was helpful to stick and pass through the occlusion presumably due to degenerated valve.

• Although stent placement in central venous obstruction does not prolong the patency, we can expect good durability of stent in this case.

Summary