Endovascular Stenting for Palliative Treatment of Superior Vena Cava Syndrome in End-Stage Lung Cancer

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(Live demo site in LINCAP 2014, 2016)
Disclosure

Speaker name:

Chen I-Ming

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

✔ I do not have any potential conflict of interest
Introduction

• Superior vena cava (SVC) syndrome:

  **SVC compromised**

• It causes dyspnea, swelling of upper trunk, and rarely but lethal, swelling of larynx and cerebral edema

Introduction

• Etiology:
  – lung and mediastinal malignancy *compression* (80%)
    • NSCLC
    • SCLC
    • Lymphoma
    • Metastases
  – Thrombosis

• Incidence: **2-4%** in end-stage lung cancer

Rice TW et al. *Medicine (Baltimore)* 2006;85:37-42
Introduction

• The mean life expectancy after developing SVC syndrome is 6 months

• Intention to treat
  – *Alleviate symptom*
  – Treat underlying disease

# Introduction

<table>
<thead>
<tr>
<th></th>
<th>Success rate</th>
<th>Symptom relieve</th>
<th>Recurrence rate</th>
<th>Life expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>chemotherapy</td>
<td>70~80%</td>
<td>1~4 weeks</td>
<td>20~50%</td>
<td></td>
</tr>
<tr>
<td>radiotherapy</td>
<td>50~80%</td>
<td>1~2 weeks</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Surgical bypass (Jugular-atrium)</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>Life expectancy &gt; 1 year</td>
</tr>
<tr>
<td><strong>SVC stenting</strong></td>
<td><strong>&gt;95%</strong></td>
<td><strong>1~3 days</strong></td>
<td><strong>0~40%</strong></td>
<td></td>
</tr>
</tbody>
</table>

Rowell NP et al. Clin Oncol (R Coll Radiol) 2002; 14:338
## SVC stent for SVC syndrome in VGHTPE

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (year)</strong></td>
<td>58.4 (37-76)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
</tr>
<tr>
<td><strong>Cause of Superior Vena Cava syndrome</strong></td>
<td></td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>6</td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>1</td>
</tr>
<tr>
<td>Large cell carcinoma</td>
<td>2</td>
</tr>
<tr>
<td>Small cell lung cancer</td>
<td>3</td>
</tr>
<tr>
<td><strong>Previous treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>7</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>12</td>
</tr>
<tr>
<td><strong>Duration of Superior Vena Cava syndrome from diagnosis (months)</strong></td>
<td>20.3 (1-53)</td>
</tr>
<tr>
<td><strong>Stenosis site</strong></td>
<td></td>
</tr>
<tr>
<td>SVC</td>
<td>10</td>
</tr>
<tr>
<td>SVC + Right internal jugular vein</td>
<td>1</td>
</tr>
<tr>
<td>SVC + Right internal jugular vein + Innominate vein</td>
<td>1</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>5</td>
</tr>
<tr>
<td>Previous port-A insertion</td>
<td>2</td>
</tr>
</tbody>
</table>

### Procedure and outcomes

<table>
<thead>
<tr>
<th>Approach site</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right internal jugular vein</td>
<td>1</td>
</tr>
<tr>
<td>Right common femoral vein</td>
<td>11</td>
</tr>
<tr>
<td>Anesthesia</td>
<td></td>
</tr>
<tr>
<td>General anesthesia</td>
<td>3</td>
</tr>
<tr>
<td>Local anesthesia</td>
<td>9</td>
</tr>
<tr>
<td>Pre-dilatation</td>
<td>3</td>
</tr>
<tr>
<td>Post-dilatation</td>
<td>12</td>
</tr>
<tr>
<td>Thrombolytic therapy with urokinase</td>
<td>3</td>
</tr>
<tr>
<td><strong>Number of stent</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Post-operative anti-thrombosis therapy</strong></td>
<td></td>
</tr>
<tr>
<td>Warfarin</td>
<td>2</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>10</td>
</tr>
<tr>
<td>Follow-up (months)</td>
<td>11.5 (0.3-17)</td>
</tr>
<tr>
<td><strong>Symptoms relieved</strong></td>
<td>12</td>
</tr>
</tbody>
</table>

**6-month primary patency rate** 91.67%

**6-month secondary patency rate** 100%

**Pre-stenting SVC narrowest diameter** 2.16 mm (0~5.5mm)

**Post-stenting SVC narrowest diameter** 11.17 mm (8~13.5mm)

**Stent thrombosis**

- **Total** 1
- **Partial** 1
Tumor mass
Wall stent deployment (20 x 55mm)

Post dilatation (XXL 18 x 40mm)

Final venography
A 55-year-old male presented with right arm swelling and visible superficial vein over neck. Diagnosed of lung adenocarcinoma.

Intra-operative venogram revealed compressed SVC and much thrombus formation.
Suction by guiding catheter and then urokinase infusion (bolus 4000U/kg and retention for 10 mins)
Partial thrombosis

Stent compression by tumor

Total thrombosis

Secondary intervention with thrombus suction, thrombolysis and ballooning
Discussion

• The aim of treating SVC syndrome is to alleviate patient’s discomfort

• The traditional chemotherapy and radiotherapy take times (weeks to months), with recurrence rate about 20-50%
Discussion

- SVC stenting has **technical successful rate** over 95%, **clinical successful rate** over 90%.

- The procedure could be carried out under **local anesthesia**.

- The symptoms improved **1-3 days** later.

- Intolerance to thrombolytic therapy or anticoagulation may be the only contraindication.
Discussion

• Major complication such as stent migration, SVC rupture, cardiac tamponade, massive pulmonary embolism and hemorrhage were extremely rare.

• The incidence of in-stent stenosis or thrombosis was 10-40%, could be managed by secondary intervention.
Discussion

• Limited prospective studies comparing stenting and other treatments, without large randomized trial

• Limited series reported

• SVC stenting has been advocated as the first line treatment.
Conclusion

Stenting of SVC is a safe alternative treatment for SVC syndrome.

Stenting of SVC may be considered as first line palliation to improve the patient’s quality of life.

Need more cases and RCT.
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Thanks for your attention!
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