LEFT CAROTID CANNULATION FOR ACUTE AORTIC DISSECTION

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There are two methods for cerebral protection in cardiovascular surgery requiring circulatory arrest:

- deep hypothermia, which may also be complemented by retrograde cerebral perfusion (CP),

- selective antegrade cerebral perfusion (CP)

Because the choice of cannulation site in the first method does not seem to play a role, the cannulation of one arch artery in the second method results in an antegrade perfusion of the aorta and, in particular, in simplified handling of antegrade CP for which brain perfusion need not be interrupted.
Initially, the carotid artery was only cannulated to establish an additional arterial line for CP, mainly in connection with the second line in the femoral artery.

However, single cannulation of the carotid artery is also a simple and safe approach for arterial return during cardiopulmonary bypass (CPB).
The main goal of this presentation is to evaluate this technique, in our daily practice.
Cannulation strategies can be broadly classified into central and peripheral cannulation strategies. Sites of central cannulation (CC) include the ascending aorta itself as well as the innominate, subclavian and axillary artery, whereas femoral artery cannulation is synonymous with peripheral cannulation (PC).

In certain cases where the dissection has extended to the innominate and subclavian artery’s all the way through the iliac vessels, cannulating the traditional sites is not possible.
DIRECT CENTRAL CANNULATION ???

How safe is it ????
INNOMINATE ARTERY CANNULATION WITH GRAFT
INNOMINATE ARTERY CANNULATION WITHOUT GRAFT
RIGHT AXILLARY CANNULATION
IS RIGHT AXILLARY ARTERY CANNULATION SAFE IN TYPE A AORTIC DISSECTION WITH INVOLVEMENT OF THE INNOMINATE ARTERY??????
DISSECTION OF INNOMINATE ARTERY
the femoral artery remains a bailout option in the emergency situation when institution of cardiopulmonary bypass is required rapidly.

Is axillary superior to femoral artery cannulation for acute type A aortic dissection surgery?
Vasileios Patris Levon Toufektzian Mark Field Mihalis Argiriou
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The advantages and disadvantages of each cannulation strategy

<table>
<thead>
<tr>
<th>Cannulation Strategy</th>
<th>Advantage</th>
<th>Disadvantage</th>
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<tbody>
<tr>
<td>Femoral artery cannulation</td>
<td>Quick to establish CPB, Easy to access even with closed chest, Less likely to be dissected</td>
<td>Possible more malperfusion due to retrograde aortic flow, Possible atherosclerotic emboli</td>
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<tr>
<td>The right axillary artery cannulation</td>
<td>Antegrade flow, Can be used for antegrade cerebral perfusion route</td>
<td>More time-consuming, Technically demanding in some cases, Possible injury to the brachial nerves</td>
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<td>Central aortic cannulation</td>
<td>Antegrade flow, Quick to establish CPB</td>
<td>Possible false lumen perfusion, Possible aortic rupture</td>
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<td>Transapical cannulation</td>
<td>Antegrade flow, Quick to establish CPB, Less likely to cause aortic rupture</td>
<td>Technically unfamiliar to many surgeons, Dangerous in patients with aortic stenosis</td>
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Left carotid cannulation is subject to the limitations of unilateral cerebral perfusion according to cannulation site, not unlike when using the innominate or axillary artery, mostly regarding anatomical variations of the circle of Willis, an aspect which is not routinely evaluated before surgery.
The choice of the optimal arterial cannulation strategy for surgery on proximal aorta and arch remains......

A CONTROVERSIAL AREA
AND
A SUBJECT OF INTENSE DEBATE
We present the cases of 11 such patients, out of 52 who underwent emergency surgery for acute type A aortic dissection in the past 18 months who’s left carotid artery was used as the indicated cannulation site.
• 3 Bentall + hemiarch
• 4 ascending aorta + hemiarch
• 2 ascending aorta + hemiarch + graft to innominate
• 2 Bentall + total arch, due to retro type A after stent at descending thoracic aorta for type B, and aneurism.
Mean circulatory arrest 28 min
Mean cardiac arrest 90 +/-30 min
Moderate hypothermia 26 C
All with Custodiol cardioplegia
No stroke
No neurological disturbance
All were extubated the next day
For 2 out of 11 patients the decision to cannulate the left carotid was made \textit{intraoperatively}, while for the other 9 it was apparent from the \textit{CT scan} that other sites were unsuitable.
DISSECTION TYPE A

the best cannulation strategy for aortic surgery assumes increasing importance due to its impact on clinical outcomes.
4 aspects differ among the cannulation strategies. These include:

- malperfusion during the cooling period,
- the time needed to establish cardiopulmonary bypass,
- possible differences in the brain protection strategy during circulatory arrest, and
- the possible exacerbation of aortic dissection during cannulation and the cooling period.
The skin incision of about 3–4 cm is made along the medial margin of the sternocleidomastoid muscle, beginning approximately 3 cm above its sternal insertion and continuing towards the earlap. After separation of the platysma muscle, the sternocleidomastoid muscle is prepared around its median margin and the jugular vein is exposed just below the muscle. The CCA is isolated medial to the jugular vein. The vagus nerve can be easily localized deeper between the CCA and the jugular vein, enabling the avoidance of the nerve injury for example, inclusion of the vagus nerve during the clamping of the artery.
After double cross-clamping with vessel loops, a longitudinal incision of about 1–1.5 cm is made between them and an 8 mm vascular prosthesis is anastomosed end-to-side to the artery with a continuous 6.0 Prolene suture.

The vascular prosthesis is connected with a 22-Fr cannula (EOPA Medronic) and the arterial line is completed.
LEFT CAROTID CANNULATION
CONCLUSIONS!

- Antegrade flow
- Quick to establish CPB
- Less likely to cause aortic rupture
- Can be used for antegrade cerebral perfusion route
- Easy to access even with closed chest
- Less likely to be dissected
- Technically familiar to many surgeons
THANK YOU FOR YOUR ATTENTION