Success of mitral isthmus ablation has been related to CT scanner mitral isthmus anatomy.

No study has described electro-anatomical mitral isthmus anatomy and its effect on radiofrequency catheter ablation success of perimital flutters occurring after atrial fibrillation ablation.

In consecutive 18 patients (16 males, 62±9 years) with perimital flutter, as diagnosed by activation mapping (Carto®) and entrainment mapping, who underwent radiofrequency catheter ablation, mitral isthmus was ablated by endocardial ± epicardial (if needed) linear lesion between the left inferior pulmonary vein and the lateral mitral annulus.

Acute (defined as sinus rhythm – SR - restoration during ablation) and long-term (defined as SR maintenance) procedural success were studied.

Mitral isthmus characteristics were analyzed:
- depth - defined as the minimal distance between endocardial and coronary sinus high resolution maps at the mitral isthmus level (figure 1).
- mitral isthmus length (figure 2).
- maximal mitral isthmus bipolar endocardial voltage before ablation,
- actual ablation line length (figure 3) and width (figure 4).
- radiofrequency duration and energy.

Figure 5. (A) Example of “thick” mitral isthmus with a 10 mm minimal distance between the endocardial (green) and coronary sinus (gray) high resolution maps, in which ablation was unsuccessful and (B) a “thin” mitral isthmus where both maps are in contact and ablation succeeded.

Summary of results
- In 10/18 pts (55%) SR resumed by RFCA (acute success).

<table>
<thead>
<tr>
<th></th>
<th>SR resumption (acute success)</th>
<th>No SR resumption (acute endpoint failure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=10</td>
<td>1.5±2.3 mm</td>
<td>7.5±3.8 mm</td>
</tr>
<tr>
<td>Mitral isthmus depth</td>
<td>1.1±0.8 mV</td>
<td>1±0.8 mV</td>
</tr>
<tr>
<td>Actual ablation line length</td>
<td>15.8±7.7 mm</td>
<td>28.9±20.1 mm</td>
</tr>
<tr>
<td>Mitral isthmus voltage</td>
<td>11835±6224 J</td>
<td>16561±6054 J</td>
</tr>
<tr>
<td>Epicardial energy</td>
<td>2011±4383 J</td>
<td>1324±1209 J</td>
</tr>
</tbody>
</table>

During a mean follow-up of 8.1±7.4 months after a single procedure, 47% of patients remained in SR: 50 % of successfully ablated patients vs 42.8 % of overdriven or cardioverted patients, p=0.58.

None of studied variables was associated with long term success.

Conclusion
- Lower mitral isthmus depth and shorter actual ablation line length were associated with acute success in perimital flutter ablation.
- Mitral isthmus electroanatomical characteristics might be used to optimize ablation strategy of persistent atrial fibrillation.