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学位論文題目 LATE POST-AVR PROGRESSION OF BICUSPID AORTOPATHY: LINK
TO HEMODYNAMICS

(大動脈弁置換術後遠隔期二尖弁大動脈病変の進行：血行動態との関連)

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論 文 内 容 要 旨

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学位論文題目	Late post-AVR progression of bicuspid aortopathy: link to hemodynamics (大動脈弁置換術後遠隔期二尖弁大動脈病変の進行: 血行動態との関連)		
<p>Background and aim of the study: The ascending aortic dilatation may progress after aortic valve replacement (AVR) in bicuspid aortic valve (BAV) patients. Our aim was to evaluate rheological flow patterns and histological characteristics of the aneurysmal aorta in BAV patients at the time of reoperative aortic surgery.</p> <p>Material and Methods: 13 patients (mean age: 42±9 years, 10 (77%) male) with significant progression of proximal aortopathy after isolated AVR surgery for BAV disease (i.e., 16.7±8.1 years post-AVR) were identified by cardiac phase-contrast cine magnetic resonance imaging (MRI) in our hospital. A total of nine patients (70%) underwent redo aortic surgery. Based on the MRI data, the aortic area of the maximal flow-induced stress (jet sample) and the opposite site (control sample) were identified and corresponding samples were collected intraoperatively. Histological sum-score values (i.e. aortic wall changes were graded based on a summation of seven histological criteria (each scored from 0 to 3)) were compared between these samples.</p> <p>Results: Mean proximal aortic diameter at MRI follow-up was 55±6mm (range 47-66mm). Preoperative cardiac MRI demonstrated eccentric systolic flow pattern directed towards right-lateral/right posterior wall of the proximal aorta in 9/13 (70%) patients. Histological sum-score values were significantly higher in the jet-sample vs. control-sample (i.e., 7.4±3.6</p>			

(備考) 1. 論文内容要旨は、研究の目的・方法・結果・考察・結論の順に記載し、2千字程度でタイプ等を用いて印字すること。
2. ※印の欄には記入しないこと。

vs 5.0 ± 2.0 , respectively, $p=0.03$).

Discussion: Pathogenetic explanation for a progression of BAV aortopathy after AVR surgery is still missing. In this study, we focused on patients with progressive aortic enlargement after primary AVR for BAV disease. The previous data from our colleague showed that hemodynamic factors may play a major pathogenetic role in the development of aortopathy in BAV stenosis patients [1]. Our current study demonstrates that the area of maximal flow-induced stress has more severe histological change compared with the opposite site of the aortic wall. On the other hand, we found no significant correlation between histological sum-score value and the maximal diameter of proximal aorta, although the previous analysis from Girdauskas et al. [1] demonstrated a significant correlation between the diameter of the proximal aorta and histological sum-score in the jet sample or the control sample. Another interesting finding of our current study, is that mean histological sum-score in both samples were significantly higher than the corresponding values in BAV patients undergoing primary surgery. This suggest that pathological changes in the aortic wall as identified at the time of primary surgery may persist and even increase during the late AVR course, affecting not only maximal flow-altered aortic segment but also the contralateral aortic wall.

Conclusions: Hemodynamic factors may still be involved in the late progression of bicuspid aortopathy even after isolated AVR surgery for BAV disease.

Reference:

1. Girdauskas E, Rouman M, Disha K, Scholle T, Fey B, Theis B: **Correlation between systolic transvalvular flow and proximal aortic wall changes in bicuspid aortic valve stenosis.** *Eur J Cardiothorac Surg* 2014; 46(January):234–239.

学位論文審査の結果の要旨

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論文審査委員			
<p>(学位論文審査の結果の要旨) ※明朝体 11ポイント、600字以内で作成のこと</p> <p>本論文では単独大動脈弁置換術後フォローアップ期間中に近位大動脈拡大 (bicuspid aortopathy) を認めた大動脈弁二尖弁患者において MRI による血行力学的解析および大動脈壁の病理学的解析を用い、大動脈弁置換術後 aortopathy 進行における血行力学的要因の関連について検討を行い、以下の点を明らかにした。</p> <ol style="list-style-type: none">1) bicuspid aortopathy 手術適応となった患者において右側壁または右後壁へ向かう eccentric systolic flow pattern を認めた。2) flow jet が当たる jet lesion は対象部位と比較し優位に病理学的変化をきたしていた。3) 初回手術群と比較し jet lesion, control lesion ともに病理学的変化の進行を認めた。4) jet lesion と control lesion の病理所見の差異として特に cystic medial necrosis, elastic frangementation が顕著であった。5) 血行力学的影響と bicuspid aortopathy 進行の関連が示唆された。 <p>本論文は、大動脈弁置換術後二尖弁大動脈病変進行における血行力学的要因について新たな知見を与えたものであり、大動脈二尖弁の病態解明に寄与するものである。また最終試験として論文内容に関連した試問を実施したところ合格と判断されたので、博士 (医学) の学位論文に値するものと認められた。</p> <p style="text-align: right;">(総字数 433 字)</p> <p style="text-align: right;">(平成 29 年 8 月 29 日)</p>			