

Four Cases of Scintillating Scotoma in Patients with Prosthetic Heart Valves

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We evaluated the relationship between scintillating scotoma and microembolic signals (MES) in patients with mechanical prosthetic heart valves (MPHVs). We examined the neurological symptoms and monitored MES using transcranial Doppler (DWL, Multi DopX4) in 4 patients with MPHVs, who also have scintillating scotoma. After the addition of antiplatelet agents or increasing warfarin dose, their symptoms improved along with reduction in MES counts. The results suggested that scintillating scotoma is caused by microembolism in these patients with MPHVs.

Key words: scintillating scotoma, embolic signal, Doppler, mechanical prosthetic heart valve, antithrombotic therapy

Introduction

Scintillating scotoma (SS) usually appears as migraine aura¹⁾, but the causes of it vary. It has been believed that SS is associated with reduced cerebral blood flow which follows depression of the neuronal activity spreading across the cerebral cortex and ischemia that itself seldom causes SS²⁾. On the other hand, migraine with aura is a well-known risk factor for ischemic stroke^{3)~8)}. So far several cases have been reported showing SS was caused by cerebral ischemia^{3)9)~11)}.

We report in the present paper for 4 patients with mechanical prosthetic heart valves (MPHVs), who also have SS, showing microembolic signals (MES) on transcranial Doppler (TCD). We also observed the alterations of SS and MES after modification of antithrombotic therapy.

Patients and Methods

A 10-minute TCD monitoring was recorded from the right or left middle cerebral artery using the Multi DopX4 (DWL, Germany) with 2-MHz probe in 4 patients with MPHVs. After the initial TCD, each patient was put on reinforcement of antithrombotic therapy, either by increasing the dose of

warfarin if the international normalized ratio (INR) of the patient was less than 2.1 or by adding antiplatelet therapy if it was over 2.2. After reinforcement, a second TCD examination was performed.

Results

Clinical details of the 4 patients were as follows.

Case 1: A 70-year-old woman had an operation for mitral valve replacement (MVR) (Carbomedics: CM valve) in 1995. She also had atrial fibrillation. She experienced SS after the operation. In 1997, she visited our hospital because of SS and head MRI showed multiple lacunar infarction. The amount of MES was 15 per 10-minute interval when INR was 1.6, and it decreased to 13 when INR was 2.5. After increasing dose of warfarin (INR 2.5), SS disappeared.

Case 2: A 53-year-old man had an operation for MVR (St Jude Medical: SJM valve) in 1985, and also had atrial fibrillation. He had often SS in the left upper visual fields starting few years ago. He was admitted to our hospital because of ischemic stroke in the right occipital lobe after frequent appearance of SS in 2000. The number of MES was 18 per 10-minute interval when INR was 2.06, and it reduced

6 per 10-minute interval when INR was 3.09. The INR was around 2 before admission, and after increasing dose of warfarin aiming INR at an around 3. SS disappeared afterwards.

Case 3: A 52-year-old woman had had classic migraines with SS since she was young. She had an operation for double valve replacement in 1994. She visited our hospital because of dizziness, vertigo and SS in 2002. Her SS tended to spread from a central point to the periphery. The numbers of MES were 20 per 10-minute interval when INR was 2.9, and after adding ticlopidine (100 mg/day), it became 13 per 10-minute. Frequency of SS was reduced after additional ticlopidin.

Case 4: A 43-year-old man had had SS every day since he had operation for aortic valve replacement in 2001. Head MRI showed normal. The SS type was of sudden appearance. The numbers of MES were 7 per 10-minute interval when INR was 2.25, and after adding aspirin it became 4 per 10-minute. Frequency of SS was reduced after the addition of aspirin.

Discussion

SS was associated in our four patients with MPHVs showing MES on TCD (Table). SS disappeared or was reduced in frequency after the reinforcement of antithrombotic therapy which reduced the number of MES. Therefore, it was suggested that the symptom of SS was caused by microembolism.

Raymond et al³⁾ reported 2 cases with late onset of SS due to microemboli. In one case, the frequency of SS was reduced after taking aspirin and dipyridole. Another case had dissection of the ascending aorta. Wiley⁹⁾ reported a case having a TIA attack after 3 bouts of SS⁹⁾. Nanri¹⁰⁾ reported a case of migrainous infarction with SS accompanying idiopathic thrombocytopenic purpura. Caselli¹¹⁾ reported that SS was observed in 4.4% of patients with temporal arteritis and in 35% of patients with TIA or ischemic stroke. However, SS has not been reported in patients with MPHVs.

Previous studies show that most of the MES in patients with MPHVs were considered microbubbles, because the number of MES was reduced after

Table Summary of 4 cases

Cases	Alteration of MES (10 min)	Additional therapy	SS frequency
1	15 → 0	warfarin	decreased
2	18 → 6	warfarin	disappeared
3	20 → 13	ticlopidine	decreased
4	7 → 4	aspirin	decreased

Warfarin dose was increased in case 1 and 2, because INR was less than 2.1.

Antiplatelet therapy was added in case 3 and 4, because INR was over 2.2.

MES: microembolic signal, SS: scintillating scotoma.

inhalation of 100% oxygen^{12)~14)}. Several studies reported that MES counts showed association with¹⁵⁾¹⁶⁾ or without neurological symptoms¹⁷⁾. However, there have not been any reports dealing with alteration of embolic signals after antithrombotic therapy. In all our cases, MES counts were reduced after antithrombotic treatments in parallel with the decrease in the frequency of SS. Our results clearly show the relationship between the counts of MES and SS.

Besides, our results may also suggest that SS can be a warning sign for embolic stroke under insufficient antithrombotic therapy.

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機械弁置換 4 症例における閃輝暗点

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ツツミ ユ キ コ ウチヤマ シン イチロウ ウチヤマ ユ ミ コ サ サ キ ショウイチ イワ タ マコト
堤 由紀子・内山真一郎・内山由美子・佐々木彰一・岩田 誠

機械弁置換患者において閃輝暗点と栓子シグナルとの関連を検討した。閃輝暗点を有する 4 名の機械弁置換患者に経頭蓋ドプラ (DWL 社, Multi DopX4) を用いて栓子シグナルを記録し, 神経学的症状を検討した。閃輝暗点は抗血小板療法またはワルファリン増量により改善し, 栓子シグナルも減少した。この結果から機械弁置換患者における閃輝暗点は微小塞栓による症状と考えられた。