Letter to the Editor

Mesothelial/monocytic incidental cardiac excrescence with bone marrow

To the Editor:

Here, we report mesothelial/monocytic incidental cardiac excrescence (MICE) containing hematopoietic islands. MICE is a rare lesion composed of a mixture of mesothelial cells and monocytes without a vascular network or supporting stroma.1,2 Of the approximately 50 cases of MICE reported in the literature, the median age was 61.5 years (range: 5–80 years) with a male-to-female ratio of 23:21. The size of the lesions ranged from microscopic to 50 mm. Most cases of MICE lesions originated from the cardiac chambers or valves and the pericardial sac, and were often found during the surgical treatment of mitral or aortic valve failure. Microscopically, MICE lesions are composed of monocytes with abundant cytoplasm, dotted with mesothelial cells in strips and tubular arrangements.1 In addition, adipocytes, fibrin, and inflammatory cells are often present in MICE lesions. To our knowledge, there have been no reports of MICE lesions containing hematopoietic islands. A 66-year-old Japanese man, with a history of tooth extraction because of supportive pulpitis 3 months before surgery, had a fever, cough, and sore throat and was diagnosed with a cold. After treatment with antibiotics, his fever had decreased; however, one month later, he presented with fever again, with a sinus tachycardia with pansystolic murmur, albeit without any heart failure symptoms. Because infective endocarditis was suspected, transthoracic echocardiography was performed. It showed the presence of vegetation on the anterior cusp of the mitral valve and severe mitral valve incompetence. The left atrium, including the left atrial appendage, was also examined using echocardiography, without significant findings. Streptococcus was detected in blood samples, and he was subsequently diagnosed with infective endocarditis with severe mitral incompetence. Catheterization was not performed before surgery. After diagnosis, mitral valve replacement was conducted, and left atrial appendage closure was performed to reduce the risk of arrhythmia. No visible lesions were observed in the left atrium during either preoperative examination or surgery. One year and nine months have passed since the surgery, without recurrence. Although no visible lesions were identified in the left atrial appendage before or during surgery, a 4 mm-diameter cell cluster was microscopically shown to adhere to the endothelium at the luminal surface of the left atrial appendage upon pathological examination (Fig. 1a). The lesion was primarily composed of cells with round nuclei and abundant cytoplasm. In addition, another cell type with small dark nuclei occurred sporadically (Fig. 1b).

Immunohistochemistry demonstrated cells with round nuclei and abundant cytoplasm that were positive for CD68 (clone: PG-M1), indicating they were monocytes (Fig. 1c). The cells with small dark nuclei were positive for Podoplanin (D2-40) (Fig. 1d), Wilms tumor 1 (WT-1) (Fig. S1a), calretinin (Fig. S1b), indicating they were mesothelial cells. This cluster did not contain a supporting stroma but was accompanied by fibrin, adipocytes, and microcalcifications. Inflammatory cell infiltration was not noticeable. These results indicated that the cell cluster demonstrated features of MICE lesions.

Interestingly, this case of the MICE lesion included multiple hematopoietic islands with a network of reticular cells (Fig. 1e, f). The hematopoietic islands were composed of granulocytes (Fig. S2a), and CD71-positive erythroid cells (Fig. S2b). A small number of cells in the hematopoietic islands were positive for CD34, and were identified as either myeloblasts or vessel endothelial cells (Fig. S2c). However, the MICE areas, other than the hematopoietic islands, lacked CD34-positive endothelial cells. These results indicated that the hematopoietic islands were nearly identical to normal bone marrow.

Histological examination of the mitral valve revealed destructive changes including neutrophilic infiltration and bacterial colonies. These findings were consistent with the features of mitral valve incompetence due to infectious endocarditis. The etiology of MICE lesions has been controversial. Both artifactual and reactive hypotheses have been proposed to explain this lesion.3,4 The artifactual hypothesis suggests that mesothelial cells stray into the cardiac lumen after surgery. However, several cases could not be explained by this hypothesis. Another hypothesis proposes that MICE lesions are the result of reactive changes caused by surgery, inflammation or other stimuli.1 In many cases, catheterization had been previously conducted.5 However, all cases could not be explained by this theory. In our case,
no catheterization was performed, and the left atrium was also examined by preoperative echocardiography; however, the lesion at the luminal surface of the left atrial appendage was not found before surgery.

We propose the following reasons that the hematopoietic islands were identified in our case of MICE. It is well known that bone marrow sometimes enters the circulatory system when bone is fractured. Bone marrow emboli found in lung capillaries after rib fracture due to chest compressions during cardiopulmonary resuscitation appear morphologically identical to the hematopoietic islands in our MICE case. Although bone marrow may flow into the circulation during thoracotomy, the circulating bone marrow would be trapped in the lung capillaries and would not reach the left atrial appendage. Undoubtedly, however, the hematopoietic islands would stray into the cardiac lumen of the left atrial appendage during surgery.

If MICE lesions are formed before surgery, the bone marrow would be found near its surface. However, the hematopoietic islands in our case were in fact located inside of the MICE lesion, surrounded by monocytes. If the bone marrow were mixed with monocytes and mesothelial cells during surgery, it would be a reasonable explanation for the presence of hematopoietic islands inside the MICE lesion. We might then assume that bone marrow, monocytes, and mesothelial cells may stray into the cardiac lumen from outside of the heart during surgery. In other words, the existence of hematopoietic islands in the MICE lesion may support the artifactual hypothesis.

As far as we know, this is the first report to describe a MICE case with bone marrow. This case could lead us to gain new insight into the mechanism of MICE lesion formation.

Figure 1  (a) In a solid cell cluster, the circles indicate the multiple hematopoietic islands. (b) Two types of cells are present: the majority of cells have round nuclei and abundant cytoplasm, and the other cell type (arrows) has small dark nuclei. (c) Most of the cells with round nuclei and abundant cytoplasm are CD68 (clone: PG-M1)-positive monocytes. (d) The scattered cells are mesothelial cells that are positive for D2-40. (e) The bone marrow is composed of adipocytes, granulocytes, and erythroblasts. (f) The reticulin network is identified through silver staining. Scale bars: 1 mm (a), 100 μm (b, e, and f), 200 μm (c and d).
DISCLOSURE STATEMENT

None declared.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher’s website.

FIGURE S1. In the MICE lesion, the scattered cells are mesothelial cells that are positive for WT-1 (a) and calretinin (b). Scale bars indicate 200 μm. Abbreviations: MICE, mesothelial/monocytic incidental cardiac excrescence; WT-1, Wilms tumor 1.

FIGURE S2. In the bone marrow, granulocytes are stained in red by Naphol AS-D chloroacetate esterase Giemsa staining (a). Erythroblasts are positive for CD71 (b) and form erythroid islands. Arrows indicate CD34-positive myeloblasts, and arrowheads indicate endothelial cells (c). Scale bars indicate 100 μm.