Journal of Cardiology Cases 12 (2015) 30–31

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Editorial

Editorial: Incidental tumor or ablation-promoted oncogenesis?

Keywords:
Cardiac myxoma
Catheter ablation
Atrial flutter

Cardiac tumors are rare and the incidence of primary tumors have been reported from 0.0017% to 0.19% in autopsy studies. Myxoma is the most frequent cardiac tumor, representing about 50% of all benign neoplasms of the heart. In more than 90% of patients, myxoma was diagnosed incidentally [1]. A minority of patients showed specific syndromes (so called Carney complex). Carney syndrome is characterized by specific clinical manifestations, such as myxomas in other sites (e.g. cutaneous, mucosal, breast), cutaneous lentiginosis, acromegaly, Cushing syndrome (primary pigmented nodular adrenocortical disease), large-cell calcifying, Sertoli-cell tumors of the testis, and psammomatous melanotic schwannoma [2].

Although cardiac myxoma can be found in a wide age range, it is clearly more common among adults, who present at an average age of 50 years; furthermore, nonsyndromic cardiac myxomas occur more commonly in women than in men [3].

The mechanism for neoplastic transformation of cardiac myxoma is still unclear. Although genetic factors clearly play a role in myxoma formation, they do not appear to offer a consistent explanation in sporadic cases. A study by Li et al. reported finding evidence for herpes simplex virus type 1 infection in 70% of a relatively small cohort ($n = 17$) of surgically resected sporadic cardiac myxomas [4]. Regardless of the precise etiology of cardiac myxoma, morphologic, ultrastructural, and immunoperoxidase studies suggest that the neoplastic cells are of primitive multipotential mesenchymal origin [5]. Most myxomas (75%) are located in the left atrium. Most of the remainder (18%) is found in the right atrium. These tumors are typically found in the region of the fossa ovalis [5].

The case report in the current issue demonstrated cardiac myxoma at the left interatrial septum after atrial flutter (AFL) ablation [6]. Interestingly, cardiac myxoma already has been reported to develop after catheter ablation in 6 case reports [6]. The time to diagnosis of myxoma after ablation ranged from 3 months to 6 years. These case reports raised interesting questions, "the etiology of myxoma was radiogenic or not?"

In the current case report, myxoma was detected at the left septum 6 months after radiofrequency ablation for cavo-tricuspid isthmus dependent AFL, so called common AFL. The cavo-tricuspid isthmus dependent AFL was the most common macro-reentrant tachycardia of right atrium. The bidirectional block of cavo-tricuspid isthmus is achieved by radiofrequency applications in most cases, resulting in more than 90% of patients maintaining sinus rhythm during long-term follow-up. This procedure usually does not require a trans-septal approach. Therefore, radiofrequency delivery and the mechanical trauma appear to be unrelated to the development of cardiac myxoma of left-sided atrial septum in this case. The locations of myxoma and ablation sites were not correspondent in 3 of 6 published case reports [6].

The ionizing radiation poses increased cancer risks. Roguin et al. reported that brain cancer develops especially in left brain of physicians performing interventional procedures. The left side of the head is known to be more exposed to radiation than the right [7]. The relation between internal radiation exposure and cancer risk are not known in the patients undergoing interventional procedures. The procedure time and fluoroscopic time were not available in this report, but catheter ablation was usually completed with fluoroscopic time of less than 30 min in AFL patients. On the other hand, AF ablation requires trans-septal approach and longer fluoroscopic time compared to AFL ablation. Recently the number of AF ablations was increasing all over the world. However, cardiac myxoma developing after AF ablation is also rare. These phenomena suggest that this myxoma was most likely an incidental tumor, which just accidentally occurred after ablation. However, further investigation for the risk of radiogenic-induced cancer is required.

Regardless of the mechanism of the tumor development, this report also indicated the rapid growth rate of cardiac myxoma. Before the ablation, no tumor was detected by thoracic heart ultrasonography. Surprisingly, the dimension of the tumor was about 2.7 cm × 4 cm in four-chamber apical view 6 months later. The growth rate was calculated as more than 0.66 cm/month. Cardiac myxoma is a relatively rare cardiac tumor and diagnosed as developed tumor incidentally. Therefore, this case report

DOI of original article: http://dx.doi.org/10.1016/j.jccase.2015.01.001

http://dx.doi.org/10.1016/j.jccase.2015.04.001

showed invaluable observation in the oncogenesis of cardiac myxoma.

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24 March 2015