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LETTER TO THE EDITOR

Kawasaki disease: Specific considerations in the management of coronary artery sequelae

Doença de Kawasaki: Considerações específicas no tratamento de sequelas nas artérias coronárias

Kawasaki disease (KD) is widely regarded as an acute autoinflammatory condition in children presenting with high-grade and persistent fever, in association with a variety of multiorgan manifestations.[1–3] Of note, coronary arteritis has been the most dangerous manifestation, mainly due to its potential association with subsequent complications, including coronary artery aneurysms (CAAs) and stenoses, which have long-term clinical implications.[1–3] In their recently published article, Magro et al. (1) described a case of KD complicated by giant CAAs and critical left anterior descending (LAD) artery stenosis, managed with coronary artery bypass grafting (CABG). In this context, we would like to comment on this interesting case together with a couple of specific considerations in the management of emerging coronary sequelae associated with KD.

First, evolution of coronary artery stenosis has been mechanistically ascribed to the process of luminal myofibroblastic proliferation, which also accounts for CAA regression in a large portion of patients with KD.[2] In other terms, gradual reduction in luminal CAA diameter generally comes at the cost of progressive stenotic lesions surrounding the CAAs.[2] Consistent with this, temporal regression of the LAD artery aneurysm (during a period of about two and a half years) seems to be associated with the emergence of a severely stenotic lesion just distal to the aneurysm in the patient.[1] Importantly, success of percutaneous coronary interventions (PCIs) might be relatively low in the management of these stenotic lesions due to their challenging morphological features (highly fibroproliferative and/or calcified) and specific predilection sites (mostly located at the proximal or distal part of the CAAs and potentially leading to stent malapposition, etc.).[1,2,4] Therefore, CABG in the present case appears to be a reasonable strategy at first glance.

However, coronary stenotic lesions can also arise due to a classical atheroma formation as a consequence of endothelial dysfunction[2,3] associated with the impact of generalized vascular inflammation and disturbed rheological kinetics (including slow and turbulent flow associated with the aneurysmal sac(s)) along the coronary arteries in certain KD cases. Interestingly, these lesions can be relatively soft in nature, and can also be located distant from the co-existing CAAs (as may have also arisen in the present case[1] the long-term), potentially rendering them more amenable to PCIs. Therefore, identification of plaque morphology with the guidance of certain imaging modalities (intravascular ultrasound, optic coherence tomography, etc.) may help determine the subsequent management strategy (CABG, PCI, rotational atherectomy, etc.[2,4]). Accordingly, we wonder whether the authors considered these imaging modalities before CABG.

Second, CAA evolution following KD episodes has been a more recognized phenomenon and is generally attributed to acute multi-layer necrotizing vasculitis.[1,2,4] In this setting, CAAs, if present, generally reach their maximum diameter around six weeks after the onset of KD.[2,3] Established CAAs have been universally managed with antiaggregant or anticoagulant medications (or both) together with certain antiatherogenic drugs in the setting of KD.[2,3] On the other hand, most complications including fistula formation, rupture, recurrent coronary ischemic events etc. generally take place in the setting of giant CAAs, characterized by a diameter of >8 mm or a Z score of $\geq$10.[1–5] Accordingly, even though the CAAs in the patient[1] might be regarded as giant ones based on their aneurysmal diameters, we wonder about the values of more objective parameters including Z score.

In terms of radical management, it is highly recommended that persistently large CAAs (whether stable or progressively expanding) be treated with elective operations including aneurysmectomy, graft stents or coil embolization etc.[2,3] even if they are totally asymptomatic under optimal medical therapy. Moreover, indication for excision of giant CAAs seems to be even stronger during elective cardiac operations performed for concomitant pathologies including valve disease,[2] coronary stenosis (as in the present case[1]). Therefore, we wonder why the surgeons exclusively performed CABG, and left the giant CAAs surgically untreated. Performing a more radical operation could have solved the problem in a single attempt. Was there a technical failure or an anatomical obstacle (including involvement of the diagonal branch by the aneurysmal sac, etc.) potentially hampering excision or modification of CAAs? Unfortunately, the patient may still experience recurrent coronary ischemic

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events (due to coronary embolization, compression on the left internal mammary artery graft by the expanding CAA, etc.) and serious mechanical complications (CAA rupture, fistula formation) potentially requiring re-operation in the long-term. On the other hand, we also are of the opinion that certain giant CAAs with a clear-cut temporal regression might be watchfully monitored under optimal medical therapy. Accordingly, we wonder about the initial dimensions of the giant CAAs in the patient (the values around six weeks after KD onset when the patient's CAAs were supposed to have maximum diameters).[1] Were the giant CAAs progressive, regressive or stable in time according to the Z score values? Based on temporal changes in CAA diameters, CAA involving the LAD artery seems to have a regressive nature as opposed to the CAA of the right coronary artery with a potential tendency to expand in time. We also wonder whether the authors would consider renin-angiotensin system blockade (particularly with captopril) that might have a favorable impact on CAA progression, largely through the inhibition of certain key mediators of arterial remodeling, including matrix metalloproteinases?[2,6]

Finally, this case report clearly supports the strong association between the evolution of coronary sequelae and the failure to administer disease-modifying agents (intravenous immunoglobulin (IVIG), etc.) in a timely manner in the setting of acute KD episodes.[1–4] This also suggests there is a need to further heighten clinical awareness of KD symptoms among parents[1] and even clinicians for the prevention of these potentially fatal sequelae.

In summary, Magro et al.[1] should be congratulated for their didactic article. In the setting of KD, management of coronary sequelae primarily need to be individualized according to patient characteristics. In KD patients undergoing cardiac surgery, management of all the existing coronary sequelae at a single time (where applicable) appears to be a reasonable strategy in clinical practice. Nevertheless, prevention of these sequelae with the timely initiation of disease-modifying agents should still be regarded as the primary goal in KD management.

Conflicts of interest

The authors have no conflicts of interest to declare.

References

1. Magro P, Carvalho N, Anjos R, et al. Coronary artery bypass grafting in a child with Kawasaki disease. Rev Port Cardiol (Engl Ed). 2021;40, 519e1–e4. PMID: 34274100.
2. Yalta K, Yalta T, Yetkin E, et al. Late coronary aneurysm formation after kawasaki disease: a review of mechanistic and clinical aspects. Korean Circ J. 2021;51:e99.
3. McCrindle BW, Rowley AH, Newburger JW, et al. American heart association rheumatic fever, endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; Council on Cardiovascular Surgery and Anesthesia; and Council on Epidemiology and Prevention Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease: a scientific statement for health professionals from the American Heart Association. Circulation. 2017;135:e927–99.
4. Brogan P, Burns JC, Cornish J, et al., Kawasaki Disease Writing Group, on behalf of the Royal College of Paediatrics and Child Health, and the British Cardiovascular Society. Lifetime cardiovascular management of patients with previous Kawasaki disease. Heart. 2020;106:411–20.
5. Yalta K, Ozturk C, Yalta T, et al. Fistulous coronary artery aneurysms: further insights into mechanistic and clinical implications. Rev Port Cardiol (Eng Ed). 2021;40:989–90.
6. Yalta K, Gurdogan M, Taylan G. Late coronary aneurysm formation in Kawasaki disease: a subtle phenomenon with potential implications. Heart eLetters. 2019 https://heart.bmj.com

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