

Complicated course of anomalous origin of right coronary artery in the left sinus of Valsava in a professional ice hockey player. A case report

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SOUHRN

Kazuistika popisuje případ 37letého profesionálního sportovce – hokejového hráče – s maligní variantou anomálního odstupu pravé koronární tepny z levého aortálního sinu a stenózy pravé koronární tepny. Vzhledem k odmítnutí podstoupit kardiokirurgický zákrok byla provedena perkutánní koronární intervence (PCI) s implantací stentu. Vzhledem k restenóze stentu byla PCI tentýž rok opakována. Po čtyřech letech od první intervence koronarografie odhalila 50% stenózu pravé koronární tepny způsobené umístěním stentu. V souvislosti s vyprovokováním nesetrvale komorové tachykardie při zátěžovém vyšetření byl poté u pacienta indikován aortokoronární bypass, který byl úspěšně proveden v prosinci 2019. Tato práce popisuje neobvyklý případ u aktivního sportovce a způsobilost sportovce ke sportu.

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ABSTRACT

We present a case report of an athlete TS, 37-year-old ice hockey player with a malignant variant of anomalous right artery (AAOCA) and stenosis of the right artery. Owing to refusal to undergo cardiosurgery, a percutaneous coronary intervention (PCI) was done using a stent implantation with repetition of the procedure in one year because of stent restenosis. Four years after the first PCI, a new coronary angiogram showed 50% stenosis of the right coronary artery caused by the position of the stent. The man was indicated for aortocoronary bypass and this was carried out successfully in December 2019. The paper comments on the unusual course in an active athlete and athlete's eligibility for sports.

Keywords:

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Athlete

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Case presentation

Athlete TS, 37-year-old, ice hockey player from childhood until 2014, at the highest level of the Czech Hockey League in this time playing the second Czech League as a professional athlete. The medical history included bronchial asthma treated with beta-mimetics from time to time, systemic hypertension and smoking (10 cigarettes a day). There was no sudden death in the family history. Cardiopulmonary exercise testing (CPET) was carried out at another sports centre with very high cardiorespiratory fitness (see Table 1) and a finding of horizontal ST depressions up to 2 mm in the work load 4.4 W/kg. Echocardiography was done with the picture of athletes' heart.

The athlete was referred to us in August 2015 for the second opinion, we sent him for CT coronarography. Figure 1 shows the anomalous origin of the right coronary artery from the left sinus of Valsava (AAOCA) – the malignant variant. The coronary angiogram confirmed the finding. Because of refusal to undergo cardiac surgery, a percutaneous intervention was done with a stent implantation Resolute Integrity 4.0×38 mm and postdilatation (Fig. 2). Eligibility for sports has not been issued.



Fig. 1 – Anomalous origin of the right coronary artery from the left sinus of Valsava – the malignant variant.

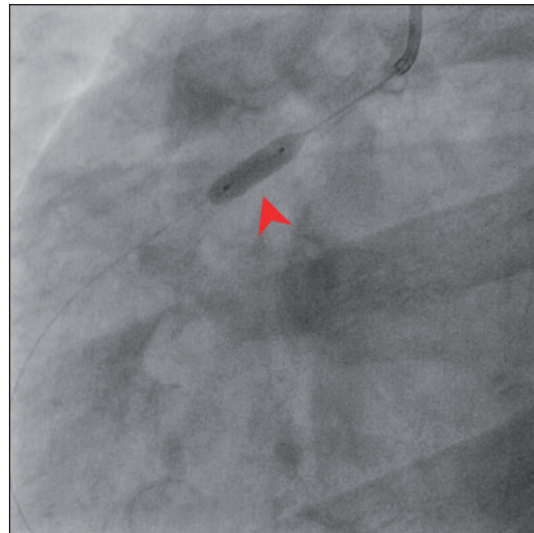


Fig. 2 – Coronary angiogram – percutaneous intervention with a stent implantation.

Three months after PCI the patient reported no trouble. The results of the CPET are shown in Table 1. He started to play professional hockey again.

Visit after one year in August 2016. The CPET was ended because of high blood pressure reaction, with significant depression of the ST segment on the ECG (Fig. 3). The patient was sent for a SPECT examination with the finding of signs of ischemia in the area of the inferior wall (Fig. 4). Coronary angiogram was done with the finding of in-stent restenosis of 50–60% with FFR 0.8 and a PCI with DES was applied. Eligibility for sports has not been issued again. The results of the CPET (3 months later) are shown in Table 1. He started to play professional hockey again.

In November 2019 the athlete still reported no trouble, the results of CPET are shown in Table 1, on the top of the exercise test, a nonsustained ventricular tachycardia was provoked (Fig. 5). A new coronary angiogram showed 50% stenosis of the right coronary artery caused by the position of the stent (Fig. 6). The man was indicated for aortocoronary bypass and this was carried out successfully in December 2019.

Table 1 – Results of CPET

Date	W/kg max	VO ₂ max ml/kg/min	BP max mm Hg	HF max Beats/min	RER
7/2015	5.2	54	250/108	178	1.19
11/2015	4.1	49.9	235/70	173	1.04
10/2016	4.5	45	235/70	169	1.05
4/2017	4.2	44.6	250/60	175	1.23
4/2018	4.0	40.4	230/80	173	1.14
10/2018	4.2	45.1	235/105	167	1.17
4/2019	4.5	40.8	220/90	179	1.27
11/2019	4.0	40.8	250/80	169	1.1

BP – blood pressure; CPET – cardiopulmonary exercise testing; HF – heart frequency; RER – respiratory equivalent; VO₂ – oxygen consumption; W – watt.



Fig. 3 – Depression of the ST segment on the ECG.

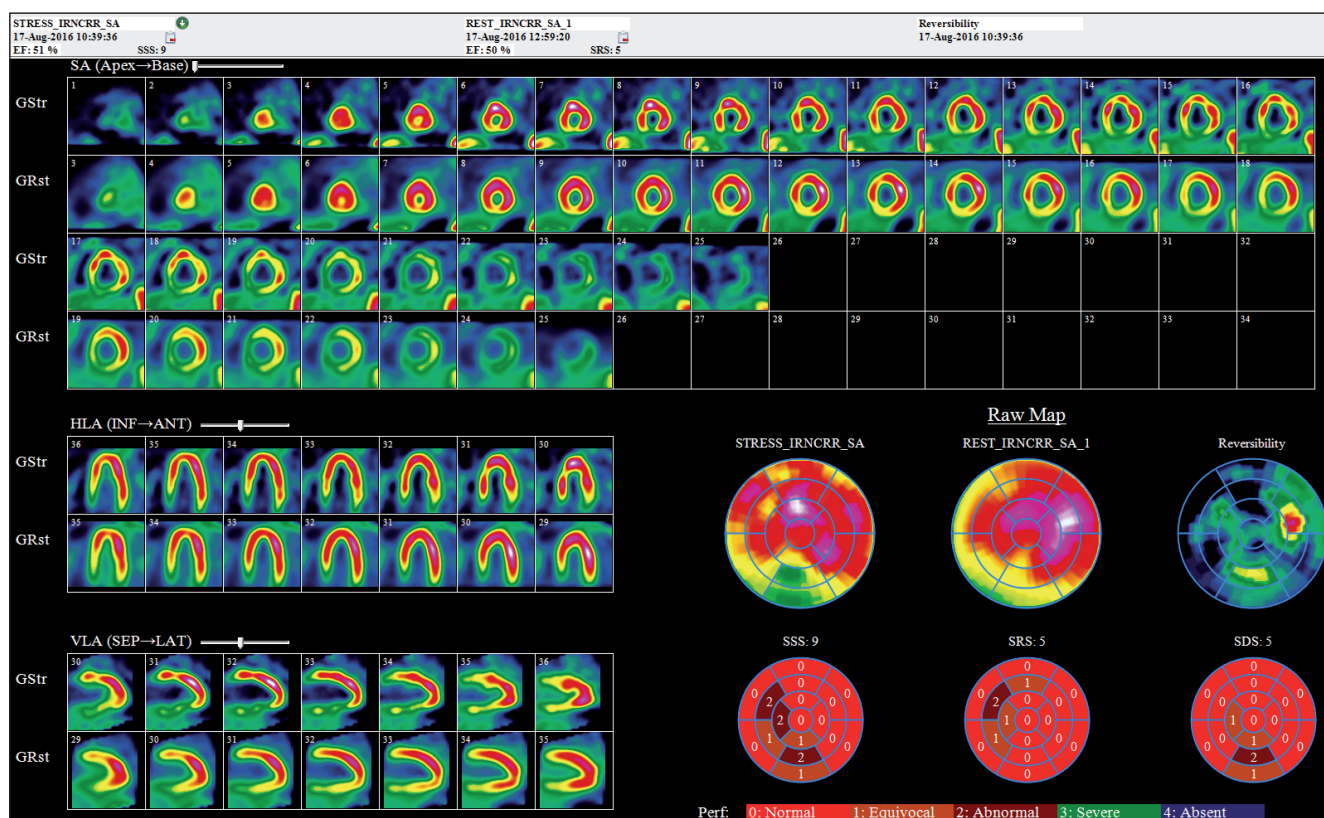


Fig. 4 – SPECT examination with the finding of signs of ischemia in the area of the inferior wall.

Discussion

Making a diagnosis of anomalous coronary artery origin is difficult as there are no hallmark symptoms or no symptoms at all. Our athlete who plays with this malignant

variant at the highest level the Czech Hockey League had no subjective symptoms. Basso¹ et al. reported 27 sudden deaths in young athletes, identified at autopsy and due to either left main coronary artery from the right aortic sinus (n = 23) or right coronary artery from the left si-



Fig. 5 – ECG with nonsustained ventricular tachycardia.

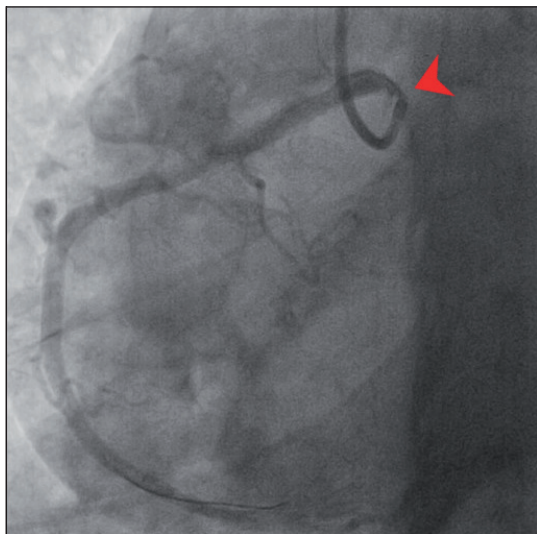


Fig. 6 – Coronary angiogram – 50% stenosis of the right coronary artery caused by the position of the stent.

nus ($n = 4$). Fifteen athletes (55%) had no clinical cardiovascular manifestations or testing during life. Premonitory symptoms had occurred in 10. All cardiovascular tests were within normal limits.

There are three options for therapeutic treatment – only medication, PCI or surgery. There is no consensus for selection of the most appropriate therapy given the heterogeneity of patient characteristics and clinical signs. The decision whether to surgically treat an anomaly of coronary artery origin and course, and the risk-to-benefit ratio of surgical treatment in preventing a potentially lethal complication of SCD, requires careful deliberation based on the best available evidence.²

Krasuski et al.³ reviewed 210 700 cardiac catheterizations performed over a 35-year period at a single institution and identified 301 adults with an anomalous coronary artery from the opposite sinus of Valsalva. Patients were stratified by the pathway of the anomalous artery

and the chosen treatment. Of the 301 patients with anomalous coronary artery from the opposite sinus of Valsalva (0.14% of the cohort), 18% had an interarterial course (IAC). Patients with IAC underwent more surgical interventions (52% versus 27%; $p < 0.001$), but had no higher mortality.

Because of patient request, we opted for PCI treatment. There are very few relevant papers in the literature. Hong et al.⁴ published two case reports and a literature review, with 3 recommendations for successful PCI – the importance of anatomic site of vessel, optimal selection of guide catheter, and experienced manipulating skills. The first PCI in our patient was successful, but a restenosis was found within one year and required new PCI. Four years later, a new coronary angiogram showed 50% stenosis of the right coronary artery caused by the position of the stent. The aortocoronary bypass was indicated in the athlete as the second treatment option. The question is how much the high intensity sport had influenced the development of the new stenosis.

Eligibility for sport

There are recommendations in recent European guidelines – in the case of a malignant version of anomalous artery with the interartery course, surgical repair in symptomatic patients is recommended.⁵ Our athlete had no symptoms and his approach excluded surgical resolution. In this case, we decided to use the PCI method to reduce the likelihood of ischemia. After the PCI, we conducted an exercise test and if the exercise test revealed no ischemia, we allowed his participation in sport.

Conclusions

We describe the complicated course of anomalous origin of right coronary artery from the left sinus of Valsalva in an endurance athlete treated with PCI and progressing to stenosis that required a surgical approach.

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