

Unusual intercoronary communication of possible traumatic origin: a case report

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Introduction

The normal coronary circulation is physiologically interconnected by intercoronary and intracoronary anastomoses that are functionally insignificant and cannot be visualized by conventional coronary angiography due to their small size. The development of significant coronary stenosis increases the flow through these anastomoses and hence their size, making them readily visible. Large intercoronary communications in the absence of obstructive coronary artery disease constitute a very rare coronary artery anomaly, which is thought to be congenital in origin and located in specific anatomic locations.

Case presentation

A 62-year-old man was admitted to our department due to typical anginotic pain. Coronary angiography revealed a subtotal occlusion of the proximal circumflex and a very unusual tortuous intercoronary communication between the left main coronary artery and the left anterior descending artery. A drug eluting stent was successfully deployed at the circumflex and the patient's symptoms resolved. Medical history was retaken revealing that he suffered a strong blunt trauma of the chest as an adolescent, which we believe could be a possible alternative explanation for the formation of the intercoronary communication. Comparison to a previous angiogram performed 4 years earlier showed that the intercoronary communication was already present and remained unchanged over the years.

Discussion

It is suggested that intercoronary communication arising from unusual locations and developing in disorganized fashion can be suspected as being of traumatic origin. We believe that there is no need for intervention to treat this type of anomaly.

Keywords

Coronary anomaly • Chest trauma • Angiogenesis • Case report

Learning points

- Intercoronary communications are rare angiographic findings which are congenital in nature and located between specific sites—the right coronary artery and the left circumflex artery or between the anterior and posterior inter-ventricular arteries.
- In a case of intercoronary communication located in unusual site—blunt chest trauma could be a trigger for its formation.
- Intercoronary communications suspected to be formed post-trauma can be considered as stable, harmless, and most likely will not cause clinical symptoms.

Introduction

Intercoronary communication (also known as *Intercoronary Continuity*) is a very rare¹ angiographic finding, in which an open-ended coronary circulation pattern is demonstrated. In contrast to coronary collateral, which is a physiological bypass to a stenotic coronary artery, intercoronary communication is an anastomosis between two unobstructed coronary arteries. This phenomenon is considered as a benign congenital² finding, only reported occurring between the right coronary artery and the left circumflex artery (LCX) or between the anterior and posterior inter-ventricular arteries.³ We present an unusual case of an intercoronary communication occurring between the left main coronary artery (LMCA) and the left anterior

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descending (LAD) artery, which we believe evolved as the result of a traumatic chest injury. This specific anomaly has not been previously reported.

Timeline

Time	Event
About 40 years ago	Patient suffered serious chest trauma
4 years ago	Patient underwent coronary angiography indicating non-obstructive coronary artery disease
3 days prior to admission	Chest pain began
Day 1	Admission to the emergency room and hospitalization in the Cardiology ward for further investigation
Day 3	Percutaneous transluminal coronary angioplasty with percutaneous coronary intervention to the left circumflex artery, demonstration of the unusual intercoronary communication
Day 4	Patient discharged in a stable condition

Case presentation

A 62-year-old Caucasian man with a medical history of diabetes mellitus, hypertension, hypercholesterolaemia, Hepatitis C, and HIV (both carrier state) was admitted to the emergency room. The patient complained about palpitations and intermittent chest pain of crushing nature that began 3 days prior to admission, was not effort related and lasted several minutes each time. Physical examination was unremarkable; apical impulse was not displaced, heart sounds were regular, S1 and S2 were normal, without any murmurs, rubs or gallops; breath sounds were clear bilaterally without any rales, wheezes, or rhonchi. Blood pressure, pulse, and SpO₂ were also within normal range. Electrocardiogram recording was obtained and showed sinus rhythm (80 b.p.m.) and left anterior hemiblock, without any signs of acute ischaemia. All laboratory parameters were within normal range, Troponin I was undetectable. The patient was admitted to the Cardiology ward for further investigation.

A thorough look in the patient medical records indicated that the patient underwent a diagnostic coronary angiography 4 year prior to present admission due to chest pain, demonstrating non-obstructive coronary disease.

During hospitalization, transthoracic echocardiography was performed and revealed a mild dilatation of the left ventricle (13 mm, normal range 6–12 mm); left ventricular diastolic dysfunction; mildly dilated left atrium (43 mm, normal range 20–40 mm); mild mitral regurgitation and dilated aortic root diameter (37 mm, normal range 20–34 mm) with mildly dilated ascending aorta (39 mm, normal range 20–38 mm).

The patient also underwent a diagnostic coronary angiography; after injection of contrast material to the left coronary system, a



Figure 1 9 RAO 20 CAU view of the intercoronary communication.

tortuous communication between the LMCA and the LAD artery was demonstrated (*Figures 1–3*), without any signs of stenosis along the mentioned arteries. The LCX showed a 99% ostial stenosis and a drug eluting stent was deployed with good angiographic result. At follow-up post-procedure, the patient reported a relief of his symptoms. On the next day, he was discharged in stable condition.

To the time of writing this case report (9 month after discharge), the patient did not have reoccurrences of the chest pain and he was not admitted again to any hospital.

Discussion

At first sight, it was evident that this type of coronary anomaly was different; the unusual location and shape of the intercoronary communication did not look like any other reported fistula, malformation, or connection. The proximity of the interconnecting vessels (LMCA and LAD artery) led us to think about a focal traumatic event as the possible cause.

We questioned the patient about any exceptional traumatic event that could potentially harm his chest; he mentioned a fight at youth which ended with the fracture of his sternum.

We reviewed the previous coronary angiography from 2013 and noticed that this intercoronary communication was present (*Figure 4*). Its appearance seemed identical; no ectasia, embolization, fistulae, or any other progression was identified in this 4 years interval.

Blunt trauma of the chest may cause coronary and/or cardiac rupture, ventricular septal defect, conduction abnormalities, and other reported injuries.⁴

We assume that in our case, the trauma may have caused a laceration in the coronary tree with neovascularization during the healing process.

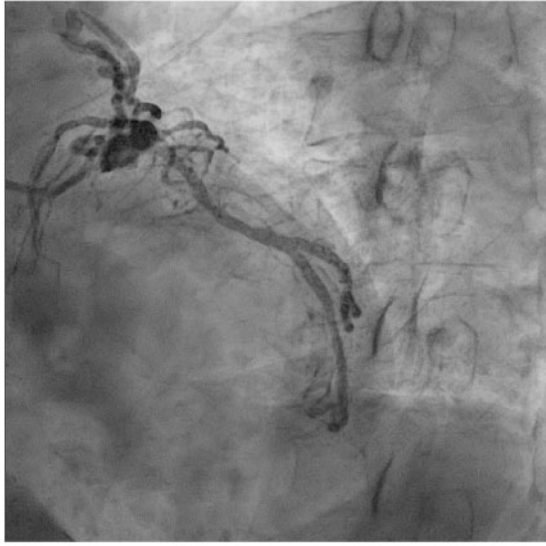


Figure 2 35 LAO 18 CAU view of the intercoronary communication.



Figure 4 20 RAO 2 CAU view of the intercoronary communication from 2013 angiography.

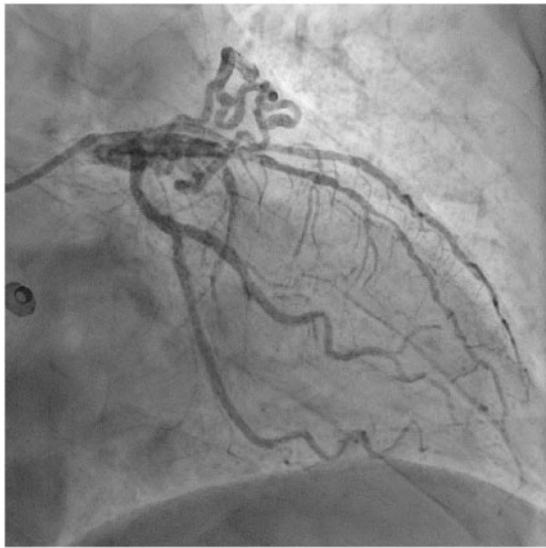


Figure 3 35 RAO 3 CRA view of the intercoronary communication.

Neovascularization related to trauma has been reported in the literature, usually in the context of brain and ocular injury^{5,6} by the mechanism of vascular endothelial growth factor (VEGF) release from the endothelium. Coronary arteries may rupture upon blunt chest trauma,⁴ an event which triggers mobilization of VEGF to the traumatized area.⁷

Vascular endothelial growth factor plays a central role in the formation of the embryonic coronary system⁸ and in the formation of coronary collaterals,⁹ so we speculate that the same mechanism

contributed to or facilitated the formation of the intercoronary communication we have observed.

Conclusion

The present case describes an incidental angiographic finding of an anomalous coronary communication between the LMCA and the LAD artery. The patient's symptom could be attributed to the severe stenosis of the circumflex. The patient was pain-free after discharge therefore, we assume that there was no connection between the patient symptoms and the incidental finding of the coronary abnormality. We believe that intercoronary communication arising from unusual locations and developing in such disorganized fashion can be suspected as being of traumatic origin. In spite the difficulty of proving the traumatic origin, the report of similar cases may support the assumption that this type of connection does not develop spontaneously. In our case, the intercoronary communication was stable and harmless and we did not consider any further intervention.

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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