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Clinical Image

Coronary Anomaly: The Left Anterior Descending Coronary Artery Originating from The Proximal of Right Coronary Artery

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1. Keywords

Coronary anomaly; Left main coronary artery; Left anterior descending coronary artery; Coronary angiography; Computed tomography

2. Clinical Image

Coronary artery anomalies (CAAs) are present at birth, but are usually asymptomatic and are found during coronary angiography (CAG) or multi-slice computed tomography (MSCT) detection. Their prevalence is less than 1.3% based published series [1-4]. The most common coronary anomaly is separate origination of the left anterior descending coronary artery (LAD) and left circumflex coronary artery (LCX) from left sinus of Valsalva. The second most common anomaly is the anomalous right coronary artery rises from the proximal of the LAD. The third anomaly is origination of the LCX artery from the right coronary artery (RCA) or right sinus of Valsalva. We present a case is that the left descending coronary artery (LAD) originating from the proximal of the right coronary artery. The case is very rare.

42-year-old young man complaint of continuous chest pain for more than 20 minutes and companied with sweat, presented with none ST elevation myocardial infarction (NSTEMI), and was admitted to our department on 15, July 2013. He suffered from diabetic mellitus, hypertension and hyper-lipidemia for five years. Electrocardiogram was normal, but CK-MB concentration elevated to 44.62 ng/mL and troponin T concentration was 0.547ng/mL. The patient underwent cardiac catheterization through trans-radial approach because of onset of none ST elevation myocardial infarction after ten days. In the LAO caudal projection, the left anterior descending (LAD) coronary artery was absent (**Figure a**). Angiography demonstrated that the LAD artery originates from the proximal of right coronary artery (**Figure b**). The LAD artery had 80% stenosis in the distal segment, the LCX artery was patent, and the RCA was patent and dominant, the intermediate branch had 99% stenosis in the proximal segment. A 6F left Judkins 3.5 guiding-catheter was used to engage the left coronary system to perform percutaneous coronary intervention (PCI) on the intermediate branch and one stent was implanted. A 6F Amplatz 1.0 guiding catheter was used to the ostium of the right coronary artery, and a BMW wire was insert to the anomalous LAD and another stent deployed in the distal of LAD segment successfully. The final angiographic result was excellent (**Figure c)**.

In order to confirm the origin and course of anomalous LAD artery, a 64-slice computed tomography (MSCT) of the heart was performed on a 64-slice machine (Philips 64 Slice, Philips, Netherland) after 5 days of PCI operation. The results showed the anomalous LAD artery originating from the proximal of the RCA, and the anomalous LAD coursing between the aorta and pulmonary artery. According to Lipton's classification, the coro-nary anomaly was classified as type R-IIB subtype (**Figure d** and **e**).

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Figure 1(a): Mottled hyperpigmentation with peripheral scaly erythematous papules on the trunk and Inguinal folds.

Figure 1(b): Dyschromic macules on lateral aspect of the neck.

Figure 1(c): Pruritic papules on the anterior aspects of the left thigh.

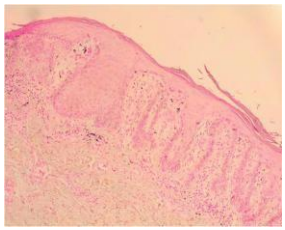

Figure 2: Elongated epidermal rete ridges with bud-like filiform projections, suprapapillary thinning and mixed inflammatory infiltrate in the papillary der-mis (x 100, PAS).

3. Discussions

Coronary artery anomalies(CAAs) are present at birth, but are usually asymptomatic and are found during coronary angiog-raphy or multi-slice computed tomography (MSCT) detection. Their prevalence is less than 1.3% based published series[1-4]. The most common coronary anomaly is separate origination of the left anterior descending coronary artery (LAD) and left cir-cumflex coronary artery (LCX) from left sinus of Valsalva. The second most common anomaly is the anomalous right coronary artery rises from the proximal of the LAD. The third anomaly is origination of the LCX artery from the right coronary artery (RCA) or right sinus of Valsalva. We present a case is that the left descending coronary artery (LAD) originating from the proximal of the right coronary artery. The case is very rare. Single coro-nary artery (SCA), defined as an artery that arises from an arterial trunk of the coronary sinus of Valsalva and nourishes the entire myocardium. The incidence of SCA is a rare congenital occurring in approximately 0.024% of the population according to Lipton's reports [2]. The anomalous coronary artery is first designated with "R" or "L" depending upon whether the ostium is located in the right or left sinus of Valsalva. It is then designated as group I, II, or III anomalies. Group I has anatomical course of either a right or left coronary artery. Group II anomalies arise from the proxi-mal part of the normal right or left coronary artery, and cross the base of the heart before assuming the normal position of the inherent coronary artery. Group III describes the anomaly where the LAD and LCX arise separately from the proximal part of the normal RCA. Five anatomical subtypes exist and are classified according to the relationship of the anomalous coronary artery with the aorta and pulmonary artery, i.e., "anterior," "between," "septal," "posterior," and "combined." In this series, the "septal" subtype was the most common, whereas the "between" type was rare[2-4]. However, the left anterior descending coronary artery (LAD) derives from the proximal of the RCA is extremely rare. Tt's prevalence is less than 0.018%[1].

The case we presented is the anomalous LAD arises from the proximal of right coronary artery (RCA). The origin and course of anomalous LAD was confirmed by MSCT technique, the re-sults demonstrated that the anomalous LAD coursed between the aorta and pulmonary artery. It is very rare case. We bring forth the case in an attempt to highlight their significance. These anomalies are considered to be an independent risk factor for ad-verse cardiovascular events including sudden cardiac death and dealing with their lesions is a challenge to cardiologists.

Coronary anomalies are usually detected during coronary an-giography[1,2]. However, X-ray angiography is limited by its inability to provide information regarding the spatial orienta-tion of the anomalous artery with regarding to the surrounding cardiovascular structures[4,5]. MSCT (multi-slice computed tomography) technique has the potential to accurately visualize the coronary artery [6] and clearly demonstrate the surrounding cardiovascular structures of the anomalous coronary artery [7]. In this case, the MSCT images clearly demonstrated the origin and course of the anomalous the left anterior descending coro-nary artery. So we bring forth the case in an attempt to high-light their significance, and make cardiologist understood what important the anomalies are. Coronary artery anomaly provides a unique challenge to cardiologists when dealing with critical lesions of coronary vasculature, which would otherwise have been easily amenable to angioplasty. Presence of coronary artery anomalies create challenges during coronary angiography, Per-cutaneous coronary interventions, and coronary artery bypass graft surgery [8].

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