A Case of Rumpel-Leede Phenomenon in Ulnar Artery Catheterization

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Abstract  Rumpel - Leede phenomenon (RLP) was described as early 1909 by Theodore Rumpel and by Stockbridge Leede in 1911 in patients suffering from scarlet fever. Acute development of petechial rashes distal to the application of blood flow occlusive devices such as a blood pressure cuff or tight wrapped bandage is a typical finding in this phenomenon. Multiple isolated cases of RLP associated with coronary angiogram have been reported. In this report, we present a case of a 53-year-old male who developed RLP after percutaneous intervention of the proximal-mid left anterior descending artery after application of a sphygmomanometer cuff to contain a right forearm hematoma and application of a trans-radial band. We here discuss the etiopathogenesis and management of RLP that develops post coronary angiogram.

Keywords: Rumpel - Leede phenomenon, coronary angiogram, Ulnar Artery Catheterization, petechial rash, TR band, forearm hematoma


1. Introduction

Rumpel-Leede phenomenon (RLP) was described as early 1909 by Theodore Rumpel and by Stockbridge Leede in 1911 in patients suffering from scarlet fever [1]. Acute development of petechial rashes distal to the application of blood flow occlusive devices such as a blood pressure cuff or a tight wrap bandage is a typical finding in this phenomenon. RLP is mostly benign and resolves with conservative management. Multiple isolated cases of RLP associated with coronary angiogram have been reported in recent years. Here we present a case of RLP in a patient after an elective coronary angiogram performed via tight ulnar artery access. The procedure was complicated by a small forearm hematoma which was conservatively managed by application of a sphygmomanometer cuff to contain and stop the bleeding, following which RLS was noted. We here present the case and discuss the pathogenesis and management.

2. Clinical Presentation

A 53-year-old male with a history of diabetes mellitus, hypertension, hyperlipidemia and smoking was referred for a diagnostic coronary angiogram by his primary doctor. The patient had presented to his primary care doctor with typical angina on exertion, hence a nuclear stress test which was performed showed moderate anteroseptal ischemia. On the day of presentation, he was afebrile, heart rate was 77 beats/minute, blood pressure was 127/82 and respiratory rate was 16 cycles/min. The patient had no significant findings on physical examination, however, a weak right radial pulse of 1+ was noted. The patient’s complete blood count, complete metabolic profile and coagulation profile revealed no abnormal findings, and the pertinent values have been tabulated (Table 1). Hence a decision was made to perform a coronary angiogram using right ulnar artery access using ultrasound guidance. Prior to the angiogram, the patient was loaded with appropriate...
DPT with aspirin and plavix and high intensity statin (Rosuvastatin 40mg). Coronary angiogram revealed a >95% obstruction of the mid LAD (Figure 1). A successful PCI of the proximal to mid LAD was performed and a right ulnar TR band was applied. In the post-operative unit 30 minutes after the procedure, the patient was noted to have a small forearm swelling and was diagnosed with a right forearm hematoma due to coronary angiogram. In order to contain the forearm hematoma, a sphygmomanometer cuff was applied, 30 minutes after, it was noted that the hematoma had resolved, however, the patient was noted to have a newly formed petechial rash on the dorsal aspect of the right palm (Figure 2), hence a diagnosis of RSL was established. The sphygmomanometer cuff was released immediately after the rashes were noted. The petechial rashes completely resolved 2 days later without any further intervention.

Table 1. Pertinent laboratory values of the patient on admission

<table>
<thead>
<tr>
<th>Lab data</th>
<th>Reference range</th>
<th>On admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETE BLOOD COUNT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White blood cell count (10×3/uL)</td>
<td>4.10–10.10</td>
<td>8.1</td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>44.5–73.4</td>
<td>50.4</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>17.8–42.0</td>
<td>19.3</td>
</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
<td>12.9–16.7</td>
<td>14.0</td>
</tr>
<tr>
<td>Platelets (10×3/uL)</td>
<td>153–328</td>
<td>164</td>
</tr>
<tr>
<td>HEMATOLOGIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prothrombin time (seconds)</td>
<td>11-15</td>
<td>12</td>
</tr>
<tr>
<td>Partial thromboplastin time (seconds)</td>
<td>25-40</td>
<td>33</td>
</tr>
<tr>
<td>INR</td>
<td>&lt;1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>METABOLIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>0.66–1.25</td>
<td>0.73</td>
</tr>
<tr>
<td>Blood urea nitrogen (mg/dL)</td>
<td>9.0–20.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Figure 1. Coronary angiogram showing greater than 95% obstruction of the proximal-mid left anterior descending artery (left) and successful drug eluting placement in the lesion (right)

Figure 2. Rumpel-Leed phenomenon on the dorsal aspect of the right palm
3. Discussion

Multiple cases of RLP associated with coronary angiogram have been reported, the findings of which are summarized in Table 2 [2-6]. RLP has been typically reported in literature after prolonged blood pressure inflations, however, multiple other conditions are known to cause RLP (Table 3) (Figure 3) [7]. Increased capillary fragility, antiplatelet and anticoagulation during the procedure, arterial occlusion due to vascular access sheaths, venous and capillary hypertension due to compressive devices such as trans-radial bands or sphygmomanometer cuffs, venous compression due to forearm/arm hematomas are contributing factors for the development of RLP post-coronary angiogram [2-6]. RLP sign is mostly benign and represents ruptured capillaries leading to petechiae formation [2-6]. RLP is not associated with any major complications or limb loss, and hence rarely demands any intervention directed to reverse the petechiae. Anticoagulation and antiplatelet therapy can be safely continued in these patients after percutaneous coronary intervention. Anticoagulation and antiplatelet reversal is not needed if RLP is observed. Venous return should be facilitated by prompt pressure release in arterial occlusive devices and gentle pressure should be applied over any arm or forearm hematoma to avoid venous/capillary hypertension.

Table 2. Summary of reported cases of Rumpel-Leede phenomenon reported post coronary angiogram

<table>
<thead>
<tr>
<th>Paper</th>
<th>Age and Sex</th>
<th>CVD risk factor</th>
<th>Procedure</th>
<th>Access site</th>
<th>Vascular closure</th>
<th>Complications</th>
<th>Antiplatelet used</th>
<th>Anticoagulation</th>
<th>Complete resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018, Rattka et al [2]</td>
<td>69,M HTN</td>
<td>Coronary angiogram</td>
<td>Left radial</td>
<td>TR band</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes, after 2 days</td>
<td></td>
</tr>
<tr>
<td>2018, Abdullah et al [3]</td>
<td>53,F -</td>
<td>PCI of RCA</td>
<td>Right radial artery</td>
<td>TR band</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020, Toufaily et al. [6]</td>
<td>65,F Smoking, HTN, HLD</td>
<td>PCI of RCA</td>
<td>Left brachial artery access</td>
<td>Brachial band</td>
<td>-</td>
<td>ASA, Plavix</td>
<td>Yes, After 2 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theetha Kariyanna et al.</td>
<td>53, M HTN, HLD, DM</td>
<td>PCI of proximal to mid LAD artery</td>
<td>Right ulnar artery</td>
<td>sphygmomanometer cuff</td>
<td>Right forearm hematoma needing BP cuff application</td>
<td>ASA, Plavix</td>
<td>-</td>
<td>Yes after 2 days</td>
<td></td>
</tr>
</tbody>
</table>

M- Male  
F- Female  
HTN- Hypertension  
HLD- Hyperlipidemia  
DM- Diabetes mellitus  
PCI- Percutaneous intervention  
RCA- Right coronary artery  
LAD- Left anterior descending  
UFH- Unfractionated heparin  
ASA- Aspirin  
TR band- Trans radial band

Table 3. Conditions associated with RLP [7]

- Elderly patients  
- Hypertension  
- Diabetes  
- Idiopathic thrombocytopenic purpura/Thrombotic thrombocytopenic purpura  
- Platelet dysfunction  
- Diabetes Mellitus  
- Fat embolism  
- Intravenous drug users  
- Infectious diseases such as Rocky Mountain spotted fever, dengue fever, meningococcemia  
- Disseminated intravascular coagulopathy  
- Mechanical trauma  
- Connective tissue disorders such as; Ehlers-Danlos syndrome  
- Calcium channel blocker usage  
- Chronic steroid use  
- Drug-induced erythema multiforme  
- Leukemia  
- End stage liver diseases  
- Renal dysfunction
4. Conclusion

RLP post coronary angiogram is a benign phenomenon that can be conservatively managed. RLP does not demand anticoagulation or antiplatelet reversal and resolves spontaneously upon prompt venous decongestion and hematoma management.

References