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Rumpel-Leede phenomenon observed after spinal cord stimulator implantation

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Introduction

Rumpel-Leede phenomenon refers to acute dermal capillary rupture secondary to increased venous pressures such as during sphygmomanometer cuff inflation. It typically presents as a petechial rash distal to the source of pressure. Rumpel-Leede phenomenon was first reported in 1909 by Theodore Rumpel and again independently in 1911 by Carl Stockbridge Leede [1]. While treating patients with scarlet fever, they both noted petechiae on the patients' distal arms where a tourniquet had been applied. Initially referred to as the tourniquet test and later as a Rumpel-Leede capillary-fragility test, this finding has been used to assess patients for thrombocytopenia and capillary fragility. The Rumpel-Leede capillary-fragility test was part of the World Health Organization's recommendations for diagnosing dengue fever in resource-limited settings and was also previously used to diagnose microangiopathy in diabetics [2,3].
Risk factors for Rumpel-Leede phenomenon include increased venous pressure during non-invasive blood pressure (NIBP) cuff cycling, hypertension, diabetes mellitus, thrombocytopenia, heritable connective tissue disorders, and medications including steroids, antiplatelets, or anticoagulants. Though Rumpel-Leede phenomenon is itself self-limiting, differentials of this phenomenon should include anaphylaxis, vasculitis, or a burn if short term resolution does not occur.
We report a case of Rumpel-Leede phenomenon due to NIBP monitoring in a patient with hypertension, polycythemia vera secondary to COPD, and active smoking undergoing spinal cord stimulator implantation. Rumpel-Leede phenomenon presented in our patient as a prolonged petechial rash distal to the NIBP cuff.

Materials and Methods

As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements as per University of Pittsburgh policy. Patient informed consent was obtained for submission of a case report.

Results/Case Report

A 59-year-old female with a history of lumbar laminectomy and fusion, hypertension, coronary artery disease, COPD complicated by secondary polycythemia vera, chronic back pain secondary to degenerative disc disease, and active smoking presented for a spinal cord stimulator (SCS) implantation.

She had a successful SCS trial before her permanent implantation with greater than 80% pain reduction and improved function.
The patient was placed on standard American Standards Association (ASA) monitors for the SCS implant procedure. A sphygmomanometer was placed on her right forearm and set to cycle at three minute intervals. The procedure lasted ninety minutes. Shortly after completing the case she developed skin changes on her right hand, fingers, and distal forearm below the level of the cuff [Figure 1]. The patient did not complain about pain, altered sensation, or weakness in the affected extremity. She was otherwise hemodynamically stable.

Discussion

The Rumpel-Leede phenomenon is described as petechia secondary to increased venous pressures such as during sphygmomanometer cuff inflation. It occurs due to increased capillary fragility secondary to microangiopathy. This phenomenon has been applied in the past to assess patients for thrombocytopenia and capillary fragility and to diagnose microangiopathy in diabetics [2,3]. Diagnosis is made based on the distribution of the rash in the peripheries distal to the source of pressure. The differential can include anaphylaxis, vasculitis, or burn.
Our case documents the Rumpel-Leede phenomenon or acute dermal capillary rupture secondary to non-invasive blood pressure (NIBP) cuff cycling in a non-diabetic patient with hypertension, polycythemia vera, and active smoking. The Rumpel-Leede phenomenon presented in our patient as a prolonged petechial rash distal to the NIBP cuff.
Rumpel-Leede phenomenon has typically been seen in patients with diabetes, hypertension, thrombocytopenia, connective tissue disorders, and those on steroids, antiplatelets, or anticoagulants [4]. We suspect a twofold cause of vascular fragility in our patient—smoking and microangiopathy due to hypertension. Smoking has overhwelmingly been linked to peripheral vascular disease, vascoconstriction, and hypetension. We suspect that this chronic vasculopathy in addition to the increased venous pressure during NIBP cuff cycling in a hypertensive state contributed to our patient developing the classical petechial rash of Rumpel-Leede phenomenon. Rumpel-Leede phenomenon has been described previously in hypertensive patients undergoing NIBP cuff monitoring [4].
Prevention of Rumpel-Leede phenomenon includes risk factor control, avoiding excessive NIBP cuff cycling, and placing a thin layer of badding between the cuff and skin. A thin layer of padding has been shown to significantly reduce cuff-related trauma without significantly affecting blood pressure readings [5].
The Rumpel-Leede phenomenon presents as a rash due to dermal capillary rupture usually secondary to increased venous pressure from NIBP cuff cycling. Though it is self-limiting and does not cause permanent damage, Rumpel-Leede phenomenon can be stressful to the patient and can cause diagnostic dilemma—potentially leading to costly workups. The authors believe that it is important to recognize this phenomenon and to recognize patients at risk and consider preventative strategies such as alternating cuff sites, decreasing cuff cycling frequency, and placing a thin layer of fabric between the cuff and skin.

References

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Disclosures

No

Tables / Images