Acute onset severe ischaemic pain at rest of the lower limbs and buttocks caused by severe anaemia: lessons from 2 cases

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Keywords: Acute ischaemic pain; pain at rest; anaemia; intermittent claudication

Introduction

Peripheral arterial disease is a commonly observed manifestation of atherosclerosis which leads to a substantial risk of morbidity and mortality. Anaemia is known to act as a precipitant for end organ damage in myocardial infarction and ischaemic stroke [1]. This effect is mediated by an abrupt onset hypoxia leading to tissue ischaemia. However, acute ischaemic pain at rest in the buttocks or lower limbs as a presentation of anaemia is observed infrequently in clinical practice. We report two patients who presented with such acute onset severe ischaemic pain at rest in the lower limbs and buttocks caused by severe anaemia.

Case 1

A 62 year old male presented to the surgical casualty complaining of abrupt onset excruciating bilateral lower limb pain at rest for 12 hours. Five years ago he had been working as a labourer in a tea estate. During this time he began to experience bilateral calf pain on exertion, which was reproducible at a claudication distance of 500 m. The pain disappeared within 5-10 minutes of rest. His claudication distance was static. He smoked approximately 10 cigarettes per day over the last 15 years. Six months ago, he developed a Non-ST elevation Myocardial Infarction (NSTEMI) for which he was commenced on dual anti-platelet medication. He did not experience any cardiac symptoms thereafter and had a haemoglobin level of 12 g/dl. He did not have diabetes mellitus, hypertension or dyslipidaemia. One day before his current admission he experienced progressive worsening of the bilateral calf muscle pain with pain at rest leading to this admission.

On examination he was severely pale. His pulse rate was 108 beats/minute and blood pressure was 110/80 mmHg. Pulse examination revealed that his bilateral dorsalis pedis and posterior tibial pulses were absent. He did not have any arterial ulcers. His abdominal, respiratory and nervous system examination was normal. Digital rectal examination

showed evidence of melaena.

Investigations revealed a haemoglobin level of 5.2 g/dl with iron studies and a blood picture showing iron deficiency type anaemia. Considering the cardiovascular risk with acute limb ischaemia, we initiated blood transfusions to optimize oxygen carrying capacity. We observed that the severity of the calf pain reduced with repeated transfusions. After optimizing his haemoglobin to 10.2 g/dl, he could walk 300-400m and climb 2 flights of stairs without pain. Meanwhile a large pre-pyloric ulcer was found on endoscopy. His CT angiogram of the lower limbs showed bilateral femoro-popliteal vascular disease (Figure 1).

Figure 1. CT angiogram of the lower limbs show bilateral femoro-popliteal vascular disease.

Case 2

A 71 year old man presented with severe acute onset bilateral buttock pain at rest for ten days despite non-steroidal anti-inflammatory agents and Tramadol. He was previously healthy. He was a heavy smoker consuming 30 cigarettes per day, but did not have diabetes or hypertension. He had history of previous lower limb claudication.

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On examination he was severely pale. His pulse rate and blood pressure was normal. Pulse examination revealed absent femoral, popliteal and ankle pulses. He had no gangrene or ulceration on his lower limbs. There was no focal neurological deficit or evidence of sacroilitis.

Investigations showed haemoglobin of 3.7 g/dl. After transfusing two units of packed cells, he showed complete resolution of buttock pain. His post transfusion haemoglobin was raised to 6.3 g/dl. The CT angiogram of aorto-iliac vessels showed severely stenosed aorto-iliac vessels with the absence of both internal iliac vessels (Figure 2).

While evaluation of the cause for anaemia, he was found to have moderate hepatosplenomegaly and his blood picture and bone marrow tests led to a diagnosis of chronic lymphocytic leukaemia. He received treatment and follow-up by the haematology team and his haemoglobin was maintained at 7-10 g/dl with regular transfusions. He remains pain free at the moment.

Figure 1. CT angiogram showing severely stenosed aorto-iliac vessels with the absence of both internal iliac vessels.

Discussion

Occlusive arterial disease occurs as a manifestation of generalized atherosclerosis in elderly age groups with an age related prevalence of 12% [2]. It is associated with a high future risk of cardiovascular mortality [3,4]. Symptoms of claudication occur due to the limitation of blood flow to the active muscle, thereby limiting the oxygen and nutrients necessary for the continuity of muscle metabolism. Several factors influence this limitation such as: stenosis of the blood vessels, blood viscosity, blood flow velocity and the oxygen carrying capacity of blood. The degree and the length of

stenotic segments and multiple sequential arterial occlusions can further compromise the circulation to the muscle, while the development of collaterals partially compensate for the arterial insufficiency [5].

Although at rest the blood supply may become adequate to maintain the internal milieu of muscles, on exertion the stenotic vessels don't allow adequate amount of blood to flow to the muscle resulting in a hypoxic environment. This results in anaerobic metabolism and lactic acid induced muscle damage causing subsequent pain. This pain disappears with rest once the metabolic demand reaches a basal level [6].

Anaemia reduces the oxygen carrying capacity to the peripheral tissues. With the reduction of haemoglobin, the haematocrit also reduces by isovolemic haemodilution. Subsequently, to counteract the relative tissue hypoxia compensatory adjustments take place. These include an increase in cardiac output, redistribution of blood flow to some tissues and an increase in the whole body oxygen extraction ratio. Concurrently to preserve coronary and cerebral blood flow, blood flow to the kidney, liver, spleen, intestines and skeletal muscle are shunted to the vital organs [7].

It has been found that nearly 10% of claudicants and 50% of patients with critical limb ischemia have co-existent anaemia [8]. With the detection of tissue hypoxia, the vascular bed distal to the arterial occlusion usually gets dilated by vasodilating metabolites that are produced by the exercising muscle. These metabolites act preferentially on the healthy vascular districts resulting in shunting of blood from the ischaemic areas toward the normoperfused areas. This blood steal may further reduce the effective muscular blood flow, thereby worsening the ischaemia [9]. Likewise, several mechanisms contribute to the worsening of claudication due to anaemia.

Conclusion

Anaemia is considered as a risk factor for myocardial infarction and ischaemic stroke. Although same pathophysiology exists, occurrence of acute onset bilateral ischaemic pain at rest of the calves or buttocks has been sparsely observed in clinical practice. Anaemia is often overlooked as an important denominator of acute ischemic pain at rest in the lower limbs, which upon correction would result in a significant improvement of the functional outcome. In our patients, treating the anaemia led to a dramatic improvement of their symptoms.

References

1. Dubyk MD, Card RT, Whiting SJ, Boyle CA, Zlotkin SH, Paterson PG. Iron deficiency anemia prevalence at first stroke or transient ischemic attack. *Can J Neurol Sci.* 2012 Mar; 39 (2): 189-95. <http://dx.doi.org/10.1017/S0317167100013214>
2. Criqui MH, Fronek A, Barrett-Connor E, Klauber MR, Gabriel S,

- Goodman D. The prevalence of peripheral arterial disease in a defined population. *Circulation* 1985; 71: 510-515.
<http://dx.doi.org/10.1161/01.CIR.71.3.510>
3. Regensteiner JG, Steiner JF, Panzer RJ, Hiatt WR. Evaluation of walking impairment by questionnaire in patients with peripheral arterial disease. *J Vasc Med Biol.* 1990; 2: 142-152.
 4. Criqui MH, Langer RD, Fronek A, Feigelson HS, Klauber MR, McCann TJ, Browner D. Mortality over a period of 10 years in patients with peripheral arterial disease. *N Engl J Med.* 1992; 326: 381-386.
<http://dx.doi.org/10.1056/NEJM199202063260605>
 5. Francisco J Serrano Hernandoa, Antonio Martín Conejeroa. Peripheral Artery Disease: Pathophysiology, Diagnosis and Treatment. *Rev Esp Cardiol.* 2007; 60: 969-82.
 6. Stubbing NJ, Bailey P, Poole M. Protocol for accurate assessment of ABPI in patients with leg ulcers. *Journal of Wound Care.* 1997; 6(9): 417-418.
 7. González-Alonso JI, Olsen DB, Saltin B. Erythrocyte and the regulation of human skeletal muscle blood flow and oxygen delivery: role of circulating ATP. *Circ Res.* 2002 Nov 29; 91(11): 1046-55.
<http://dx.doi.org/10.1161/01.RES.0000044939.73286.E2>
 8. Chapler CK, Cain SM. The physiologic reserve in oxygen carrying capacity: studies in experimental hemodilution. *Can J Physiol Pharmacol.* 1986 Jan; 64(1): 7-12.
<http://dx.doi.org/10.1139/y86-002>
 9. Vega de Céniga M, Bravo E, Izagirre M, Casco C, Estallo L, Esteban M, Barba A. Anaemia, iron and vitamin deficits in patients with peripheral arterial disease. *Eur J Vasc Endovasc Surg.* 2011 Jun; 41(6): 828-30.
<http://dx.doi.org/10.1016/j.ejvs.2011.01.017>

Key Points:

- Acute onset ischaemic pain at rest occurring in the lower limbs or buttocks is a rare presenting feature of anaemia.
- Correcting the anaemia will promptly relieve the acute ischaemic pain in the lower limbs or buttocks of these patients.