

Case Report

REVERSAL OF PERSISTENT JUVENILE PATTERN AND IRON DEFICIENCY– A PROBABLE HYPOTHESIS OF LINKAGE

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ABSTRACT

At birth, the right ventricle is larger and thicker than the left ventricle, reflecting the greater physiological stresses placed upon it in utero (i.e. pumping blood through the relatively high-resistance pulmonary circulation). This produces an electrocardiographic (ECG) picture reminiscent of right ventricular hypertrophy in the adult: marked rightward axis, dominant R wave in V1 and T-wave inversions in V1-3. The persistence of this juvenile pattern is seen in 1-3% of adults and is more common in women and in black people. This is traditionally regarded as nonsignificant clinically, although certain grave conditions like hypertrophic cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy may resemble ECG findings (Hampton, 2008). Till now, only incomplete pubertal development has been independently linked to persistence of this ECG pattern (Migliore F *et al.*, 2011). Now, is there a link between persistent juvenile pattern and absolute or functional iron deficiency? The following case depicts an instance of reversal of this pattern within 1 week of treatment of iron deficiency in a 25 year old female.

Keywords: Iron Deficiency, Juvenile Pattern

INTRODUCTION

Iron deficiency can be absolute or functional, based on hemoglobin and ferritin levels (Kasner *et al.*, 2013). Among the many cardiovascular changes that occur with moderate to severe iron-deficiency anaemia, the most clinically significant are non-specific ST-T changes in ECG (Mani *et al.*, 2005) and the iron-deficiency induced cardiomyopathy. It has always been known that these cardiac changes are rapidly reversible by proper and timely iron supplementation (Hegde *et al.*, 2006). After total dose iron (TDI) infusion, left ventricular performance and electrophysiological changes improve greatly much before actual rise in hemoglobin levels occur, indicating the role of tissue iron in myocardial cells (Alvares *et al.*, 2000).

CASES

A 25 year old female was admitted with history of fatigue on exertion and low grade fever, since last 2 months. Clinical examination revealed severe pallor with bilateral pitting pedal oedema and resting tachycardia (heart rate of 100/min regular).

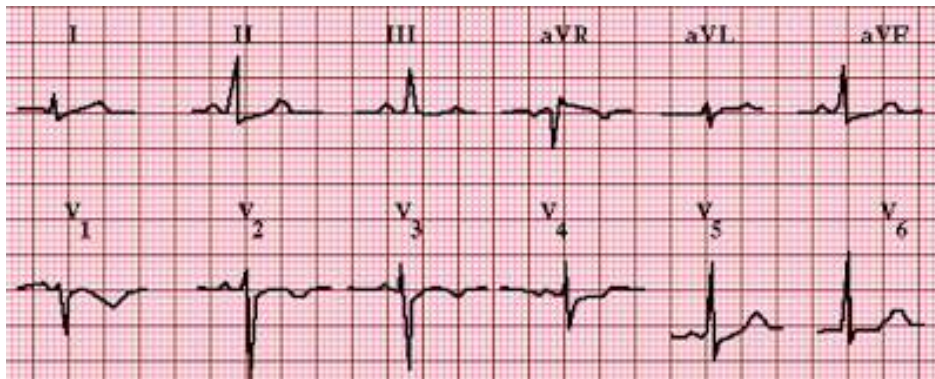


Figure 1

Case Report

Rest of the general, vital and systemic examinations was within normal limits. Blood reports were as follows: Hemoglobin 3.7 gm/dl, with Mean Corpuscular Volume 58 fl and Mean Corpuscular Hemoglobin Concentration 23.8% while white cell and platelet counts were within normal limits. Peripheral smear confirmed microcytic hypochromic red cells with occasional tear drop cells. Serum ferritin was less than 1 (normal 30-300ng/ml). Renal and liver function tests were within normal limits. Chest X-ray was normal with normal heart size while ECG revealed persistent juvenile pattern (Figure 1). Other routine tests for common infections, occult blood in stool, and ultrasonography for abdomen/pelvis was within normal limits.

We calculated the TDI (total dose iron) to be infused as about 1600 mg including 500 mg for iron stores. We infused parenteral iron sucrose with a daily dose of 200 mg elemental iron with careful clinical observation upto 1200 mg in 6 days. We repeated her ECG after 6 days and surprisingly found the T wave inversions in V1 –V3 reverted. Objectively, the patient started resuming a near-normal life with decreasing symptoms by 2-3 weeks of our therapy.

DISCUSSION

Our patient had absolute iron deficiency anaemia with coincident persistent juvenile pattern in ECG. We treated her depleted circulating and storage iron by parenteral iron therapy. The reversal of her ECG changes may be the result of the rapid effect of tissue iron on myocardial electrophysiology and metabolism. Rapid and timely iron replenishment has already been a proven treatment in cardiac conditions like heart failure (Hegde *et al.*, 2006). This case report lays down yet another probable linkage between iron deficiency and cardiac physiology. Also, this reversal lays down a hypothesis whether iron deficiency, functional or absolute, in a pregnant mother can be linked with the persistence of juvenile pattern in the ECG of her child.

Conclusion

Reversal of persistent juvenile pattern and its relation to tissue iron replenishment is an entity which needs further confirmation, on a larger scale. Around the world, the role of tissue iron has been established by various clinical trials and cases, in most tissues, including gastrointestinal tract, brain, heart and even the subconscious mind. Our case report is another stepping stone for this entity.

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