

# Acrocyanosis - An uncommon event at post anaesthesia recovery room- A case report

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### Abstract

*A healthy patient of aged 26 years underwent left ureter-lithotomy and cystostomy under general anaesthesia. In post-operative ward, both extremities were cold & nailed were cyanosed. This cyanosis persisted for as long as 8-10 hours. No abnormality was detected in arterial blood gas analysis. This is not a simple peripheral cyanosis induced by cold environment of operation theatre, as warming usually reverses the phenomenon within a short period. But in this case, peripheral cyanosis persisted for as long as 8-10 hours. Therefore, this is a case of acrocyanosis.*

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### Introduction

Acro-cyanosis is a condition of peripheral circulation characterized by symmetrical cyanosis and coldness of hands and feet. The cause is unknown but the patho physiological changes are constriction of skin arterioles and venous dilatation, causing reduction of blood flow. This is followed by increased oxygen extraction by the tissue and increased unsaturated oxygen in venous blood resulting cyanosis and reduced skin temperature. This acro-cyanosis phenomenon was typically observed in the following case report. The objectives of this report are:

- i) To describe such type of complication that may occur in post-operative period.
- ii) To find out the factors responsible behind it.

### Case-report

A healthy patient, aged 26 years, weight 65kg, ASA-1 was operated for left uretero-lithotomy and cystostomy. Clinical history, physical examination, chest- Xray, ECG were normal. In laboratory investigations, all were within normal limit except Hb% -17.6 gm and Hct-53.1%. Ultra-sonography report showed dilatation of ureter, pelvis and kidney on left side.

Anaesthesia was induced with thiopentone sodium 350mg and suxamethonium 100mg. Orotracheal intubation was done and anaesthesia was maintained with oxygen (50%), nitrous oxide (50%),

halothane (0.5%) and morphine (10mg). Ventilation was controlled by SCCS (Semi-closed- circuit system) with muscle relaxant pancuronium bromide in loading dose 1<sup>st</sup> and then divided doses as required.

Intra operative monitoring was performed by oesophageal stethoscope, continuous ECG monitoring, pulse oxymetry and manual bold pressure measurement. Patient was haemodynamically stable throughout the operation. Total fluid administration during operative period was about 2000 cc. Four hours were needed to complete the surgery. Muscle relaxation was reversed by neostigmine 2.5mg mixed with 1.2 mg atropine. Reverse from anaesthesia was uneventful.

In post operative ward, patient was conscious, responded on command. His both extremities were cool in comparison to other parts of the body. Nail beds were bluish in colour. Fine tremor was observed whole over the body. Pulse oxymetry failed to respond after attachment of sensor with fingers & toes. Arterial blood gas analysis showed PaO<sub>2</sub>-139 mm of Hg, PaCO<sub>2</sub>-33mm of Hg, HCO<sub>3</sub>-20mm of Hg, Ph -7.41, O<sub>2</sub> saturation- 97%. By use of blanket, we tried to warm the patient. Via M.C mask, oxygen 4L/ minute flow was maintained. But cyanosis of the nail beds of extremities did not recovered.

In the meantime, consultation from cardiologist and internal medicine specialist was taken. According to internal medicine, this is a case of Acro-cyanosis & to reach the definitive diagnosis, the following provisional diagnosis were suggested:

- Dysfibrinogenemia
- cold agglutination syndrome
- meth haemoglobinaemia
- cryo globulinemia

Investigations performed to rule out above suggestions were as follows:-

1. Hb-electrophoresis – A2-3.6, A-96.4, No abnormal haemoglobin
2. Fibrinogen level-300 mg% (172%-310 normal)
3. PT-13.8 sec, PTT-34.2 sec.
4. Factor-VIII activity 80% (50%- 150% normal)
5. cold agglutination-negative
6. Anti-DNA-2.7 I.U./cc (upto 7 I.U./cc normal)

### Discussion

As consultation given by internal medicine specialist, this is a case of acrocyanosis. But the causes behind this phenomenon could not be established as all the investigations done were within normal values as reported.

In operation theatre, there was a cool environment. That particular operation took about four hours. After the end of operation, Patient was transferred to the recovery room. Here, pulse oxymetry sensor failed to record the oxygen saturation, that indicates peripheral vasoconstriction; a thermo regulatory response indicating the adherent hypothermia during operative period<sup>1</sup>. Stress or spurious polycythemia<sup>2</sup> is another condition present in this particular case. Because patient's Haematocrit was 53% but total red blood cell count was  $5.74 \times 10^6 / \text{mm}^3$ . Left hydronephrosis may be another cause of relative polycythemia in this case<sup>3</sup>. The amount of fluid administration during operation was 2000 cc. But fluid requirement was 3180cc<sup>4</sup>. This inadequate fluid replacement may be an iatrogenic factor to accelerate polycythemic environment of this patient<sup>5</sup>.

Intra-operative hypothermia made various affects on body physiology. Viscosity in arteriolar and peri-arteriolar blood increases by 2-3% per 1°C drop in temperature<sup>6</sup>. Hypothermia further creates

reduced plasma volume due to transcapillary fluid loss from cold induced sympathetic stimulation<sup>7</sup> and also from extremities to splanchnic areas<sup>8</sup>. Intra-operative hypothermia results post operative shivering that causes increased metabolism, resulting osmotically entrance of water into cells and so creates heamoconcentration<sup>9</sup>. Increase in haematocrit above 50% unequivocally raises the viscosity of blood<sup>10</sup>. This blood viscosity is an important determinant of peripheral vascular resistance and adequacy of micro-circulatory flow. All these factors are responsible for increasing viscosity of blood. Therefore peripheral blood flow becomes sluggish. Peripheral vasoconstriction is a thermoregulatory response due to hypothermia, which in turn causes coldness and cyanosis peripherally.

This is not a simple peripheral cyanosis induced by cold. Because warming usually reverses the phenomenon within a short period. But in this particular case, peripheral cyanosis persisted for as long as 8-10 hours. Primary Raynaud's disease can't be a diagnosis due to absence of three phases of colour changes. Generalized hypoxia can not be described here owing to absence of central cyanosis and presence of normal arterial blood gas report. Therefore, this is a case of Acrocyanosis, leading causes of which are intra-operative hypothermia, stress poly-cythemia and iatrogenic hypovolemia. In the post operative recovery room, when patient got sufficient amount of intravenous fluid and body temperature returned to normal, cyanosis slowly disappeared.

So, this is a case of post-operative acro-cyanosis which may be an extreme form of heat-saving mechanism in the body physiology.

### Conclusion

Acrocyanosis is a post operative event occurring after general anaesthesia is a major case of urological surgery. This operation took about four hours. During the procedure, hypothermic environment of the operation theatre, stress or spurious polycythemia and iatrogenic hypovolaemia were responsible behind the incident. This cyanosis persisted for as long as 8-10 hours. By the influence of normal temperature at the post operative ward and adequate intravenous fluid volume replacement in recovery room, cyanosis slowly disappeared.

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