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Effectiveness of Hyperbaric Oxygen Therapy in Treatment of Well Leg Compartment Syndrome Post Urologic Surgeries

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Abstract: Urologic surgeries concerns the surgical treatment disorders that affect urologic pelvic structures as cancer of the prostate, adrenal glands, bladder, kidneys, ureters, testicles, and penis¹.

Compartment syndrome is a condition in which increased pressure within a limited space which compromises the circulation and function of the tissues within that space. There are numerous causes of acute compartment syndrome, including fractures, soft tissue trauma, and prolonged limb compression following drug overdose, burns, and reperfusion of ischemic tissue, however the most common precipitating factor is traumatic injury 2 .

Well leg compartment syndrome (WLCS)is being increasingly recognized after urological, gynaecologic, orthopedic or general surgical procedures with the common denominator of patient positioning in the lithotomy or hemilithotomy position³. The lithotomy position is commonly used to access the pelvis and perineum during urological, colorectal, and gynecologicalsurgery. Lower limb compartment syndrome is caused by abnormal increases in intracompartmental pressures within a non-expansile fascial space and has been recognized after prolonged elevation of the lower limbs during surgical procedures in the lithotomy position. Commonly compartment syndrome involves ischaemia, hypoxia and oedema⁴. If prolonged urological procedure is necessary patient should be monitored post operatively for early and prompt treatment of this complication. Early diagnosis and proper treatment is the main-stay of the treatment in cases of acute compartment syndrome following unavoidable prolonged urological procedures in lithotomy position⁵.

Hyperbaric oxygenation (HBO) therapy is defined as a treatment in which the patient breathes 100% oxygen at pressures greater than atmospheric; this causes the P02 to increase in proportion to the increase in ambient pressure. True HBO therapy only refers to the systemic delivery of oxygen via the lungs and is not related to "topical oxygen therapy, in which only a specific body part is subjected to locally delivered oxygen under pressure⁶.

A further form of conservative treatment for compartment syndrome is hyperbaric oxygenation. This specifically reduces oedema and floods the tissues with oxygen dissolved in the extracellular fluid. This oxygen is available to the compromised cells without the energy expenditure otherwise required for its transfer from haemoglobin. In a series of patients with compartment syndrome who were treated with hyperbaric oxygen, that none progressed and none required a fasciotomy⁷.

In traumatized hypoxic tissue such as in compartment syndrome, HBO not only tackles symptomatic hypoxia by delivering more oxygen, but also addresses the cause of hypoxia by reducing the volume of the edematous tissue. The cycle of edema-hypoxia-vasodilation may thus be interrupted and potentially reversed ⁸.

As far as the literature review is concerned, there is no enough available information to describe the changes of hyperbaric oxygen therapy on lower limb compartment syndrome after urological pelvic surgeries, therefore, this research aimed to investigate the effect of hyperbaric oxygen therapy on lower limb compartment syndrome after urological pelvic surgery, which may prove to be a promising intervention helping to decrease edema, improve blood flow to lower limb, decrease subsequent ischemia and decrease risks of post operative complications following urological surgeries.

Conclusion:

Hyperbaric oxygen therapy was useful for reducing rate of complication of lower limb compartment syndrome after urological pelvic surgery. AlsoDuplex ultrasonography is extremely effective, valid and inexpensive tool in assessment of edema.

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