Compartmental Syndrome Following Prolonged Surgery in The Lithotomy Position

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INTRODUCTION

Postoperative lower extremity compartment syndrome is a serious complication after prolonged surgery in the lithotomy position (1), and the pathogenesis and prevention of this condition have been described (2,3,4). The deep posterior compartment of the calf is bound by the tibia, interosseous membrane, fibula and transverse crural septum, and contains the posterior tibial artery and vein, the peroneal artery and vein, and the posterior tibial nerve (3). A compartment syndrome is defined as a condition in which the circulation and function of tissues within a closed space are compromised by increased pressure within that space (1). The most likely cause of this condition related to the lithotomy position is prolonged external limb compression caused by operating room stirrups (1). The pressure on the muscle mass of the calf from the stirrups probably increases the pressure in the deep compartment (3). This would elevate the local venous pressure, thus lowering the blood flow in the capillaries and causing neuromuscular ischemia (3). Muscle and nerve ischemia leads to edema, which further increases intracompartmental pressures and results in an escalating cycle of events (1). Permanent tissue damage and necrosis may occur if compartment syndrome is not promptly diagnosed and treated (1,2,3,4). In the management of compartment syndrome, the majority of authors emphasize the need for early fasciotomy (1,2,3,4), but others have suggested the feasibility of a conservative approach (5,6).

We report a case of a patient who underwent urological surgery in the lithotomy position, and developed a bilateral lower compartment syndrome, treated by conservative management, resulting in complete recovery.

CASE REPORT

A 29-year-old man underwent perineal elaborated urethroplasty, in the lithotomy position, for recurrent stricture of the posterior urethra. The patient’s medical history was remarkable for two previous urethroplasties and one urethrotomy without complications. All preoperative laboratory findings were normal.

Under general anesthesia, the patient was placed in the lithotomy position. The procedure was difficult owing to extensive scarring in the posterior urethra, and urethroplasty was carried out using perineal and suprapubic approaches. The patient was in the lithotomy position for 5 hours.

In the postoperative period, the patient experienced pain in both lower extremities. Physical examination
revealed bilateral swollen tense extremities, and the calves were tense, edematous and burning, and dorsiflexion was absent bilaterally. Laboratory data at this time showed serum CPK value of 74750, LDH 2225, AST 1631, and ALT 391, serum potassium 5.5 mEq/L and oliguria (40 ml/h). There was no evidence of myoglobinuria. Doppler examination of the lower extremities showed a slowing down of tibial and popliteal venous flow of both legs and confirmed no stenosis of the arterial districts. Computed Tomography (CT) scan of the legs showed a wide hypodense area of solea and lateral head of gastrocnemius muscle of the two calves (Fig. 1). Bilateral compartment syndrome was the diagnosis. Conservative management was used: lower legs positioned at heart level, analgesic and myorelaxant drugs used to control pain and contracture of both calves, and administration of sodium bicarbonate and crystalloids to prevent acute renal failure.

On the seventeenth postoperative day, the patient was discharged without any neurologic sequelae, and all laboratory findings were normal.

DISCUSSION

The lithotomy position provides good exposure of the perineum and lower abdomen, thus facilitating many urological surgical procedures. Angenneier and Jordan examined a series of 177 patients, placed in the exaggerated lithotomy position for urologic surgery, and determined that 15.8 per cent suffered neuropraxic complications (1).

Compartmental syndrome is a condition in which the increased intracompartamental tissue pressure, resulting in decreased blood flow and subsequent muscle and nerve ischemia and edema, provide an uncontrolled cycle of events (1,3). Permanent tissue necrosis and renal failure may occur if this condition is not promptly diagnosed and treated (1,2,3,4).

Early fasciotomy is suggested as the only reliable method to terminate the ischemia-edema cycle (1,2,3,4). Decompression by fasciotomy should be done immediately after diagnosis is established (2,3,4). Twelve hours appears to be a critical interval after which neuromuscular dysfunction, post-ischemic contractures, necrosis and extensive skin sloughing, myoglobinuric renal failure and sepsis become common (3). Delayed decompression produced a 54 per cent complication rate, with 20 per cent of patients requiring amputation (3).

Early fasciotomy was also suggested as elective therapy in patients affected by Crush Injury, following traumatic rhabdomyolysis (7,8,9,10), and some authors suggest conservative management in Crush Injury, particularly if the injury is a closed one (5,11).

The only indication for early fasciotomy in Crush Injury is open Crush Injury (5) and the outcome for crush injured limbs not treated by fasciotomy is good (5).

Compartmental Syndrome and Crush Injury show different pathophysiology, but the injured anatomic area is the same and this similarity is important in establishing therapeutic management. We performed conservative management in Compartmental Syndrome as suggested in Crush Injury.

A conservative approach to compartment syndrome has been suggested (5,6). As a matter of fact, the use of intravenous hypertonic mannitol in dogs improves intracompartamental tamponade in an animal model (12). These data suggested the feasibility of a conservative approach (5,6,12) to the management of compartmental syndrome in selected cases.

REFERENCES


