A Maneuver for Improved Positioning of a Tourniquet in the Obese Patient

KENNETH A. KRACKOW, M.D.

Generally, the majority of trained orthopedic surgeons, residents, and operating room personnel assume adequate knowledge of positioning a thigh tourniquet. However, there is usually some difficulty in achieving secure proximal tourniquet positioning in obese patients. Those patients who present the greatest difficulty are not the large muscular people, but rather those who have copious subcutaneous fat, generally of loose, flabby quality due to advanced age. In these patients the tourniquet tends to reposition itself more distally than desired. In addition, the obese patient frequently requires a relatively longer incision to achieve adequate surgical exposure, thus, a more proximal tourniquet position is important.

The specific technique described in this report has never previously been witnessed by the author in more than ten years of surgical experience at no less than ten different hospitals. The method has been applied principally to the lower extremity for knee surgery. however, it is readily applied to the humeral area with application to elbow surgery, where more proximal tourniquet positioning is especially desirable.

The maneuver was attempted and found to be successful by applying a principle taught to the author by an athletic trainer describing taping techniques for unstable ankles. The technique is neither obvious nor trivial; it is not common practice and the resulting position of the tourniquet is not "slightly" better, but vastly improved.

Assistant Professor of Orthopaedic Surgery, Johns Hopkins University, Division of Arthritis Surgery, The Good Samaritan Hospital, 5601 Loch Raven Boulevard, Baltimore, Maryland 21239.

Reprint requests to Kenneth A. Krackow, M.D.

Received: July 20, 1981.

METHOD

When positioning a tourniquet, it is common practice to place one or two long strips of adhesive tape on the extremity, then several layers of cast padding over the region where the tourniquet is to be applied. The tourniquet is then placed and pulled tight, the Velcro secured, the tourniquet strings tied, and the lower end of the adhesive strip(s) elevated from the skin and pressed over the tourniquet onto the proximal portion of the same adhesive strip(s).

The desired maneuver is accomplished simply by having an assistant manually grasp the flesh of the extremity, just below the level of tourniquet application, and firmly pull this loose tissue distally before the cast padding is placed (Fig. 1). Traction on the soft tissue is maintained while the tourniquet is wrapped and the Velcro secured. The assistant releases his grasp, resulting in a greater proportion of the subcutaneous tissue remaining distal to the tourniquet. Actually, when the flesh is released, the bulky tissue tends to support the tourniquet and push it into a more proximal position (Fig. 2). When performing this maneuver, the tourniquet sits more proximally in the obese thigh than is customary in the normally contoured thigh.

There are two other general points about placing arterial tourniquets which are not specifically related to this maneuver. They are, however, commonly ignored with important, undesirable results.

Before fastening the distal tape over the tour-

0009-92]X/82/0800/080$00.65 Cc J. B. Lippincott Co.

FIG. 1. An assistant supporting the patient's extremity at the distal leg, between the assistant's chest and humerus. The assistant pulls the flesh of the thigh distally prior to positioning the tourniquet or padding.

niquet and onto the proximal tape, the extremity should be brought down to its resting position, i.e., the hip extended to neutral or the shoulder adducted to the chest. When this is not done, the tape sticks in a proximal position. When the extremity is restored to its resting point, the tape either pulls loose or places undesirable traction on the skin, predisposing the skin to tape blisters.

More importantly, when fastening the Velcro surfaces of the tourniquet, the tourniquet should not be tightened on the thigh. This tightening maneuver is generally performed to secure the tourniquet and prevent it from slipping distally. It is ineffective and unnecessary if the flesh is pulled distally in the manner described above. The most important reasons for avoiding an unnecessarily tight tourniquet are that: (1) it interferes with exsanguination of the extremity prior to tourniquet inflation; and (2) it creates a venous tourniquet effect, which clearly increases venous bleeding when the tourniquet is deflated intraoperatively.

RESULTS

The significant improvement in tourniquet position can be appreciated by carefully comparing Figures 2 and 3. The patient is using the same tourniquet, applied once with the maneuver described, and then with the standard technique. The distance from the proximal prominence of the patella to the distal edge of the tourniquet in Figure 3 is almost exactly 1.5 times the tourniquet

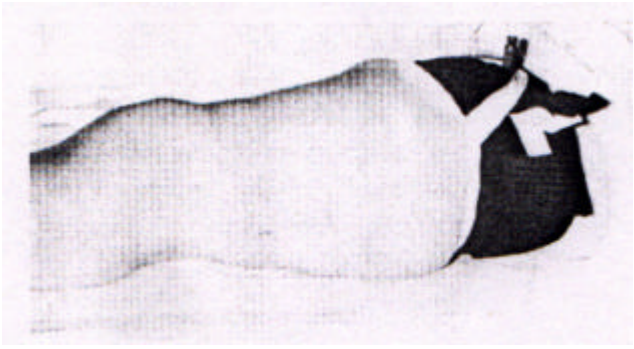

FIG. 2. A well-positioned tourniquet. (The same patient as in Figure 1.) Compare the appearance with Fig. 3.

width. The comparable distance in Figure 2, where the flesh was forcefully retracted distally, prior to tourniquet application, is more than 2.5 times the tourniquet width. The resulting improvement in tourniquet position is more than 12.5 cm which makes a higher level of draping safer and easier.

Figures 1 through 3 illustrate this technique. It is possible to position the tourniquet more proximally in the obese patient than is ordinarily achieved in the normal weight patient.

DISCUSSION

An extremely simple technique facilitates proximal positioning of an arterial tourniquet in the obese patient. Although the sim-

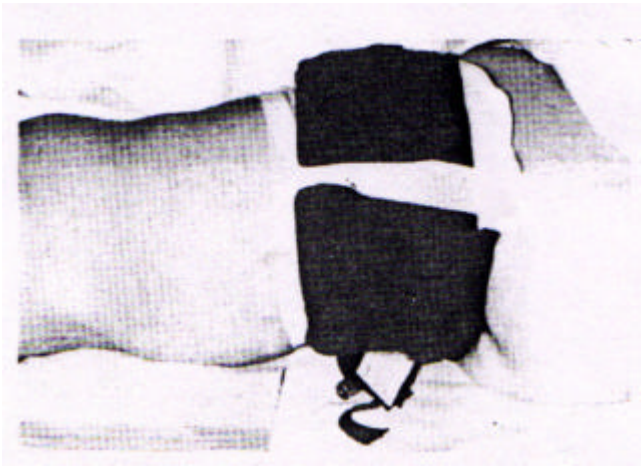

FIG. 3. The same patient as in Figures I and 2 is shown with a tourniquet positioned in routine fashion, not pulling the thigh flesh distally. The tourniquet level is much more distal than that in Fig. 2 by an amount greater than the width of the tourniquet itself.

plicity may initially suggest an obvious and trivial maneuver, this is clearly not so. The technique is only obvious after observation or description. Furthermore, the application is not trivial, inasmuch as the improved positioning results in more proximal tourniquet seating by 10.0 to 15.0 cm on the thigh, as well as a generally more secure tourniquet fixation. In fact, tourniquet position can routinely be achieved at a higher level than in a normal thigh; the technique causes the bulk and elasticity of the obese subcutaneous tissue to support and push the tourniquet farther proximally than normal.

SUMMARY

Proximal positioning of an arterial tourniquet will be greatly facilitated by having an assistant firmly draw the skin and subcutaneous tissue distally prior to positioning the cast padding and tourniquet. This simple maneuver is clearly not part of current practice or training, despite the simplicity and effectiveness.

Excessive tourniquet tightening should be avoided prior to fixing the Velcro fasteners, a practice which is commonly employed and is not only ineffective in maintaining proximal tourniquet positioning, but also deleterious in that it creates a "venous tourniquet" effect.

Loosening of the restraining adhesive tapes and unnecessary traction of adhesive tape on sensitive skin can be avoided by bringing the extremity to its resting position before fastening the tape proximal to the tourniquet.