soldiers developed while carrying backpacks for pro-
longed periods. The costoclavicular space is
bounded anteriorly by the inner third of the first rib
and posterolaterally by the superior border of the
scapula.5 This space is narrowed when there are
anomalies—congenital or acquired—of the clavicle,
first rib, or a cervical rib. The narrowed costoclavicular
space often leads to the costoclavicular syndrome.
However, when the shoulders are drawn backwards,
dampening of the radial pulse may result in certain
normal individuals by compression of the artery be-
tween the clavicle and first rib (fig. 1).5–7 The treat-
ment of this entity is weight reduction, and physi-
otherapy to strengthen the elevators of the shoulders,
improve posture, and avoid hyperabduction.7 The
majority of the patients will benefit from the above-
mentioned conservative management, although a few
patients need resection of the first rib to alleviate the
symptoms.5

Compression of the neurovascular bundle sec-
tary to assuming the sitting position has not been
reported before. We recommend that whenever a sur-
gical procedure is to be performed with the patient in
the sitting position, both the radial pulses be checked
before and after positioning the patient. Even if the
pulses are not dampened, the shoulders not be allowed
to droop downwards, as there is always the possibility
of compression of the brachial plexus without
compression of subclavian artery, which could result
in paresis or paralysis of the arm during a long surgi-
cal procedure.

REFERENCES
1. Roos DB, Owens JC: Thoracic outlet syndrome. Arch Surg 93:
71–74, 1966
2. Rob CG, Sundeven A: Arterial occlusion complicating thoracic
4. Falconer MA, Weddel S: Costoclavicular compression of
subclavian artery and vein relation to scalenus anticus syn-
drome. Lancet 2:539–543, 1945
2–32, 1971
6. Silver D: Thoracic outlet syndrome, Davis–Christopher Text-
Philadelphia, W. B. Saunders, 1977, pp 2139–2142
7. Nelson PA: Treatment of patients with cervicodorsal outlet syn-
drome. JAMA 163:1570–1576, 1957
8. Falconer MA, Li FW: Resection of the first rib in costoclavicu-

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Hemorrhage and Cardiac Arrest during Laparoscopic Tubal Ligation

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Two cases of hemorrhage from aortic injury during
laparoscopy were recently reported.4 The following
case report deals with massive hemorrhage and car-
diac arrest during a laparoscopic tubal ligation.

REPORT OF A CASE

A 38-year-old, 60-kg woman, ASA I, was scheduled for a therapeu-
tic abortion and laparoscopic tubal ligation at an outpatient
facility. The fetus was estimated to be of 8 weeks' gestation. His-

tory and results of physical examination were otherwise unremark-
able. Laboratory data included hemoglobin 12 g/dl and hematocrit
31 per cent.

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Key words: Surgery: laparoscopy. Blood pressure: hypotension.
Complications: arrest, cardiac. Shock.

Following administration of atropine, 0.6 mg, im, and fenaryl,
0.1 mg, iv, 100 mg methohexital were given iv. Infusion of 0.2 per
cent succinylcholine was started while the dilatation and curetage
was performed. Following intubation of the trachea, anesthesia was
maintained with 66 per cent nitrous oxide. Blood loss during dilata-
tion and curettage was 200 ml. Vital signs remained stable, with
blood pressure 100/60 mm Hg and heart rate 73 beats/min, while the
Verres laparoscopic needle was inserted and the abdomen was
insufflated with carbon dioxide. The heart tones then became less
audible. Nitrous oxide administration was discontinued and admin-
istration of 100 per cent oxygen was started. Blood pressure and
pulse rate were unchanged. The laparoscope was introduced with-
out problem; however, systolic blood pressure then decreased
to 60 mm Hg and heart rate increased to 100 beats/min. Neosynep-
hrine, 0.1 mg, was given iv. The surgeon, when informed of the
hypotension, saw no abnormality intravably through the
laparoscope, and found no free blood or perforations of the uterine
wall. The blood pressure and heart tones became unobtainable,
and cardiopulmonary resuscitation was started, during which lac-
tated Ringer's solution, 3,000 ml, was administered. After stabiliza-
tion of vital signs, the patient was transferred to our hospital for
observation.
on admission, hemoglobin was 5 g/dL. The abdomen was tender, with increasing distention; an exploratory laparotomy was then planned. Whole blood, 1,500 mL, was given prior to transfer of the patient to the operating room.

The patient arrived in the operating suite obtunded, with systolic blood pressure 80 torr, heart rate 120 beats/min. The trachea was intubated following administration of suxamethonium, 100 mg, iv, as a bolus. Anesthesia was maintained with 40 per cent nitrous oxide with infusion of 0.2 per cent suxamethonium during abdominal exploration.

Approximately 1,500 mL of clotted blood were present in the peritoneal cavity. A 4-cm tear in the distal aorta near the origin of the right iliac artery was identified and repaired after a large retroperitoneal hematoma was opened.

Whole blood, 8,500 mL, 5 per cent albumin solution, 500 mL, and lactated Ringers solution, 2,400 mL, were given during the procedure. Postoperatively the patient had slight pulmonary edema, which subsided in 48 hours. She was discharged ten days postoperatively.

Discussion

The tear in the aorta was caused by the Verres needle or the laparoscopic trocar. Anterior perforation of the aorta would tend to bleed more than posterior perforation done with lumbar aortography. The blood extravasated from the posterior perforation is trapped and tamponaded by the periaortic connective tissue.

Phillips reviewed more than 100,000 pelvic laparoscopies from the literature and found a 0.64 per cent incidence of hemorrhage and a 0.3 per cent incidence of cardiac arrest. McDonal et al. reported two cases of hemorrhage and hypotension following aortic injury during pelvic laparoscopy. Injury to the aorta occurred from a 16-gauge Touhy needle which was used for the insufflation of carbon dioxide. McDonald et al. suggest that aortic injury is more likely if the angle of the pneumoperitoneal needle is vertical, and recommend a 45-degree angle. McKenzie reported a case of massive hemorrhage (5,000 ml) during pelvic laparoscopy for tubal ligation. At laparotomy a tear in the broad ligament was discovered.

Ivankovich reported four cases of cardiovascular collapse and cardiac arrest during pelvic laparoscopy. One patient had pneumothorax, another a ruptured ectopic pregnancy and hemorrhage, a third a carbon dioxide embolism of the coronary and carotid arteries via a patent foramen ovale, and the fourth had vena caval compression from increased abdominal pressure.

Serious complications, though rare, can occur during anesthesia for laparoscopy. When laparoscopic tubal ligations are done at an outpatient facility, the ability to do an emergency laparotomy for massive hemorrhage and facilities for massive transfusion should be available.

References


Rectal Methohexital Premedication in Children, a Dose-comparison Study

Letty M. P. Liu, M.D., Nishan G. Goussouzian, M.D., Philip L. Liu, M.D.

Despite favorable results, the rectal administration of methohexital (Brevital®) for premedication in pediatrics is not widespread. However, we believe it can be used successfully as a premedication-induction agent while eliminating the pain associated with

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