Abdominoplasty is a widespread surgical procedure, not only for cosmetic purposes, but also to correct ventral hernias or laparocele, recti muscles diastasis or forward protruding belly. Beyond that, an increasing number of morbid obese patients previously undergone bariatric surgery, require abdominal wall reduction in the follow-up.

One of the problems that have often to be faced by the reconstructive surgeon during corrective procedures is the marked forward projection of the abdomen and its intraperitoneal contents because of lumbar hyperlordosis and abdominal muscles hypotonia. Quite often after a perfect cosmetic abdominoplasty, the patient complains of an exceedingly protruding profile on the thoracic and lumbar projection, and the endeavours to close the linea alba by plicating the midline with a series of stitches do not definitely correct the prominence. On the other hand, the doctor’s advice to a regular physical activity in order to improve the abdominal muscle tone, are not regularly followed up by the lazy patient, and lomboalgia and sciatic pain are often referred in his previous, present, and future medical history, related also to the body weight, and the kind of performed daily work.

We tried therefore to evaluate if a different surgical approach during abdominoplasty, might give more physical advantage with dedicated attention to the postural balance of posterior and anterior trunk muscles.

As a matter of fact, some basic anatomical considerations concerning the thoraco-lumboabdominal fascia continuity which envelopes dorsal and ventral muscles, lead us to conceive a circumferential support mesh to strengthen this structure whenever its function is weakened.

The use of large polypropilene or other biocompatible mesh in the anterior repair of abdominal wall defects, laparocele or hernias is a widespread surgical procedure but unfortunately it lacks of anchorage to strong supporting structures on the ventral surface. Sometimes iliac periosteal, or costo-cartilagineous stitches are applied, some other the mesh is simply stratified subcutaneously over the abdominal fascia, or, more often, buried preperitoneally under the ventral muscles after laparocele sac reduction; no attention is payed toward a potentially active support of the abdominal wall especially during strain or Valsalva manoeuvre, by the mesh, that is rather considered a further layer passively overlapping and thickening the ventral area.

Our work hypothesis, therefore was addressed to verify a more functional plastic principle that is to wrap the trunk of the patients with a dorsally prolonged mesh like the staves of a barrel thus strengthening the thoracodorsolumbar fascia envelope during active and passive motion.
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MATERIALS AND METHODS

Our study was performed on 11 patients: 8 females and 3 males aged between 42 and 65 years.

With the following diagnosis:

F. L. m. aa 70: relapsing abdominal wall schwannoma
G. M. f aa 52: laparocele and relapsing colon carcinoma infiltrating the Abdominal wall, obesity, Pain when standing.
R. L. m. aa 44: abdominal hernia and subfascial lipoma, heavy work
L. S. m. 65: obesity, hernia and recti muscle diastasis lumbar pain
N. B. f. 53: laparocele, abdominal muscle hypotonia, lumbar pain
V. B. f. 48: laparocele, abdominal muscle ptosis, lumbar pain
R. S. M. f. 51: abdominal muscle ptosis, lumbar pain
S. L. f. 53: laparocele, obesity, diabetes lumbar pain
L. M. f. 58: laparocele, incontinence abdominal wall hypotonia, lumbar pain
C. C. f. 62: obesity, abdominal wall ptosis, muscle hypotonia lumbar pain
B. C. f. 56: obesity, laparocele, abdominal wall ptosis, lipomatosis

Preoperative evaluation:
The patients were carefully interviewed about symptoms and informed consent was preliminary obtained.

Standard and lateral spine x-rays were preoperatively performed, and NMR ruled out cases whose symptoms were suspicious of lumbo-sacral disc hernia that was a formal contraindication to the “round mesh” operation. Lung function tests were also routinely investigated, and only normal patients were enclosed in the study.

The length of the “round mesh” was individually measured as follows: the trunk circumference was wrapped with a velcro strap body-belt tensed enough to avoid breath discomfort during inspiration. Circumference of the belt was then measured, and ultrasound evaluation of subcutaneous fat tissue was performed, in order to calculate the deep subcutaneous (fascial) circumference of the trunk, by simple geometrical evaluation

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\[ \text{circumference (fascial)} = \frac{\text{ext. circumference} - \text{subcutaneous thickness}}{2} \]
6-10 2/0 polypropil stitches are applied to fix smoothly the prosthesis avoiding folds and wrinkles. Bilaterally with the flanks, the fat is smoothly undermined over the thoracodorsolumbar fascia to create an access to the posterior mesh extension. Electrocoagulation allows to create a bloodless lateral tunnel.

At this point a 3cm lateral incision on the medial axillary line with a 16 blade is performed on the side of the belt origin at the level of the previously undermined deep tunnel, L1-L2 prevertebral space. A purposely built introducer is then inserted from the newly formed skin access. Basically the device is a smooth, hollow shaft, with conic tip containing the belt. It is pushed blindly and gently across the spine, and contralaterally delivered subcutaneously, paying attention not to tear the lumbar veins or stromal bundles, but just sliding over them without any damage to major blood vessels. Usually this manoeuvre is quite easy, and very rarely we chose to inspect the posterior tunnel with laparoscopic instruments and eventually clip some vein if any bleeding is observed from the lateral skin incision.

With this kind of smooth dissector the posterior mesh extension is well layered around the trunk, extruded from the contralateral flank without twisting or folding; it is finally secured to the lateral edge of the mesh with 5 strong non absorbable stitches (O/prolene).

Two drains are then introduced: one antero-inferiorly and the other from the lateral access to the epigastric area, and left in situ 48 hours. Adequate dermolipectomy "a la demande" completes the operation, and 2% iodine povidone irrigation is provided before suturing.

The skin incision is closed with three absorbable layers, and moderately tense elastic bandage is applied around the trunk, to reduce the dead space and lymph discharge, and to obtain good compressive hemostasis in the dorsal tunnel.

POSTOPERATIVE FOLLOW-UP.
Antibiotic and analgesic medication (Cefazolin 1grx2) Tramadol (100 mg x3) and ketoprofen (100 mg x2) are regularly administered during the following 72 hours. Mobilization and walking start at the first postoperative day as well as respiratory exercises to optimize lung function after abdominal cavity reduction.

All the patients were discharged between 4 and 6th postoperative day.

RESULTS:
The surgical procedure required between 2 and 3 hours to be performed. No relevant complications were observed. In one case partial necrosis of the upper wound lip required a prolonged follow-up (twice a week medication) and healed uneventfully in one month, without damage or infection to the underlying mesh.

The patients were addressed to perform physical activity and to lose some weight, if obese, increasing their physical exercise. Only two of them complained to the behaviour prescription.

A 6 months-2 years follow-up (average 15 months) confirmed the good results of the round mesh procedure in terms of abdominal support during prolonged standing or physical strain, with specific improvement of lumbar pain in 80% of cases. The trunk profile was corrected satisfactorily in those patients who complained of exceeding lumbar hyperlordosis. Control x-rays confirmed the modification of vertebral curve.

Neither limitation in bending, flexing or extending the spine was ever observed in the follow-up nor adverse effect or whatever symptom due to the large biomaterial sheet buried in the subcutane.

DISCUSSION

This second series of "round mesh" operation allowed to us to better standardize the steps of the procedure and to avoid any meaningful complication compared with the previous one.

As to the proper indication of this method, we suggest it specifically for the cosmetic or reconstructive (tumor, hernia, laparocele, recti muscle diastasis or hypotonia) abdominoplasty in
patients with exceeding belly protrusion and lumbar hyperlordosis. Many obese people after massive slimming either due to surgery or diet and medications potentially will benefit from this operation especially when the lean mass has been reduced together with the fat and the abdominal wall is loose and hypotonic.

In a previous work we used two round meshes at different height, in order to better support the spine thus applying two strength perpendicular vectors at the tips of the lordotic arch. In this group of patients we preferred a single dorsal tunnel and a wider anterior abdominal mesh in order to simplify the procedure.

The anteroposterior continuity of the round mesh mimics the function of the trunk belt in professional weight lifters; it helps the abdominal muscles to effectively support the spine erector ones during the acute strain.

During chronic efforts or prolonged standing when the ventral tone is reduced the round mesh is very much helpful in the endurance strength and this explains the improvement of lumbar pain in most of the operated patients.

As to the technical improvement in posterior tunnelization due to the introducer from a lateral access, this is to be considered a real advantage in terms of safety, speed and accuracy.

The polypropylene mesh that we used showed optimal integration with the tissue; it was not involved by infection or necrosis of the wound, and elicited a moderate collagenic response without any stiffness of the abdominal wall.

We trust that this procedure will be endorsed and practiced in the future by many abdominal and plastic surgeons because of its rationale and reconstructive potential.

LITERATURE


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