Concepts in Classical Abdominoplasty: Radical Surgery is More and Better

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This article is a concise discussion of abdominoplasty which involves the excision of redundant skin (dermolipectomy), suction-assisted lipectomy (SAL), repair of diastasis of rectus abdominus (RA) and transposition of umbilicus (umbilicoplasty). Patient selection, possible complications and post-operative care will also be briefly outlined.

History of Abdominoplasty

The history of abdominoplasty dates back to 1899 where a horizontal mid-abdominal incision was described by Kelly. In the next few decades different techniques have evolved to cater for different patients’ individualised requirements. Many different techniques vary in their design and extent in skin excision. Despite the big number of techniques, the lower abdominal skin incision approach has become most popular. Indeed the increasing popularity of SAL since the 1980’s has contributed a great deal to body-contouring techniques and the typical abdominoplasty package. Nonetheless some authorities maintain that SAL should not be done in conjunction with abdominoplasty.

The other reason for the numerous techniques that have been developed may stem from the strive towards being “minimally invasive”. Today minimally invasive is chic and almost the universal norm. Indeed many variations of abdominoplasty have evolved and these include mini-abdominoplasty and even endoscopic abdominoplasty. However these techniques cannot address the patient with more severe laxity of the abdominal skin together with other associated complaints.

Surgical Anatomy and Pathology

The musculature of the abdominal wall comprises of the paired RA. These are each enclosed in a fascial sheath and are joined in the midline at the linea alba which is a condensation of anterior and posterior rectus sheaths and also the aponeurosis of the oblique muscles. The RA runs from the medial aspect of the costal margins to the pubis. The lateral aspect of the abdominal wall musculature comprises of the external oblique, the internal oblique and the transversalis abdominis.

The vascular supply of the abdominal wall is conveniently divided into 3 zones, namely the epigastric, the lower abdominal and lateral. The epigastric zone is supplied by the deep superior epigastric artery, the lower abdominal zone by the external iliac arteries and the lateral abdominal zone by the intercostal and lumbar arteries. The venous drainage of the abdominal wall follows the arterial supply.

The term “ventral hernia” has often been incorrectly used to denote the separation of the linea alba. The pathology is not a true hernia. The correct term to use is diastasis of the RA which represents weakness of the linea alba and presents as a midline abdominal protrusion in between the paired RA.

During pregnancy or rapid gain in weight due to other reasons, substantial abdominal skin stretching can occur. In areas where the dermis is broken, striae are observed. Subsequently post-partum or after weight loss, the abdominal skin becomes lax with loss of elasticity.

Preoperative Assessment and Caution

The indications of classical abdominoplasty are typically a combination of redundant abdominal skin with laxity, abdominal lipodystrophy, diastasis of the muscular system in a lady with a history of multi-parity (Fig. 1, 2, 3 and 4). Type I denotes an abdomen with isolated lipodystrophy. Type II deformity has mild skin laxity and lipodystrophy in the lower abdomen with diastasis of the RA. Type III denotes significant skin laxity with lipodystrophy and often the presence of striae in the lower abdomen in the presence of diastasis of the RA. Type IV deformity has severe skin laxity and lipodystrophy in the upper and lower abdomen with significant diastasis of the RA. These patients are often mildly to moderately obese with the umbilicus located below the iliac crest.

Patients with type III and IV severity are ideal candidates for classical abdominoplasty. Fig 1 shows a patient with marked droopy skin on a protruding abdomen, simulating an abdomen of a lady who is 4 to 5 months pregnant.

Assessment is an important aspect in planning surgery. Striae may be observed especially in the lower abdominal skin. A pinch test determines the thickness of skin and subcutaneous fat to determine the extent of SAL necessary. Note if the umbilicus is centred or deviated and if there is an associated umbilical hernia. The presence of fullness and rolls in the flank regions should be determined. Previous abdominal surgery and related scars must be sought since they may compromise the abdominal flap in abdominoplasty. The contour of the abdomen during relaxation and Valsalva’s manoeuvre should be compared. The patient should be made aware of all these findings.
Figure 1. Pre-operative picture of subject A, anterior view

Figure 2. Pre-operative picture of subject A, lateral view

Figure 3. Pre-operative picture of subject B, anterior view, showing wrinkled and saggy skin in the peri-umbilical and lower abdominal region

Figure 4. Pre-operative picture of subject B, lateral view

Figure 5. Post-operative picture of subject A, anterior view

Figure 6. Post-operative picture of subject A, lateral view

Figure 7. Post-operative picture of subject B, lateral view, at 2 months post-operatively

Figure 8. Post-operative picture of subject B, anterior view, at 9 months post-operatively
Patient Expectation

If the patient is a potential candidate for abdominoplasty one should determine if she is ever going to be pregnant again and if she will be sensible enough postoperatively as not to binge drink or eat. The patient should be explained that abdominoplasty and SAL do not remove intra-abdominal fat and secondly the possibility that striae-bearing lower abdominal skin may not be totally excised. The implication of remaining striae is that the latter may widen further after abdominoplasty. The position and the resultant lengthy scar which may be pulled upwards should be discussed. This is always facilitated by showing the patient post-operative abdominal pictures of other previous patients (Fig. 5, 6, 7 and 8). Patients with unrealistic goals and poor self-motivation should be screened out to avoid undergoing abdominoplasty.

Contraindications and Informed Consent

The absolute contraindications and precautions are listed in tables 1 and 2.

Table 1

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<th>Absolute Contraindications</th>
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<td>Significant cardiovascular disease, significant pulmonary disease, bleeding diathesis</td>
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Table 2

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<th>Precautions</th>
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<tr>
<td>Obesity, aspirin, Chinese herbs, vitamin E, contraceptive pill, smokers, poor scar formers, allergy to Elastoplasts</td>
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The patient should be thoroughly explained the risks of dermolipectomy, SAL, repair of diastasis of the RA and umbilicoplasty. Risks can be categorised into systemic and local complications as in tables 3 and 4. The overall risks of a general anaesthesia should also be mentioned. An important point to discuss is that pulmonary function like vital capacity may temporarily decrease after diastasis of RA is repaired and the abdominal skin is tightened.

Table 3

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<th>Systemic Complications</th>
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<td>Temporary decreased vital capacity, deep vein thrombosis, pulmonary embolism, fat embolism, massive fluid shifts, lidocaine toxicity</td>
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Table 4

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<th>Local Complications</th>
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<tr>
<td>Haematoma, seroma, wound infection, wound dehiscence, contour irregularities, skin flap necrosis, umbilical deviation, umbilical necrosis, dog-ears, temporary decreased sensation of the abdominal skin, recurrence of diastasis of RA</td>
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The patient should be fully explained that abdominoplasty is not a weight-losing but a body-shaping procedure. Secondly the fact that abdominoplasty and SAL are not a substitute to dieting and exercise should be emphasised. Lastly the infrequent possibility of secondary surgery to revise scars and SAL to improve contouring should also be explained. Thorough pre-operative discussion with the patient is the key to prevent post-operative disagreement and disharmony.

Surgical Procedure

Skin marking of the costal margins, areas for SAL and the tentative elliptical dermolipectomy in the abdomen is performed while the patient stands. The abdominal aesthetic units consist of the upper abdomen, flanks, umbilicus, lower abdomen and the mons.

The surgical plan follows the sequence of markings, flap-raising to the umbilicus, SAL, flap-raising to the costal margins, dermolipectomy, repair of diastasis of RA, umbilicoplasty and lastly wound closure.

Incision is made in the lower curvature in the abdomen all the way through the Scarpa’s fascia (Fig. 9) to just short of the rectus sheath, preserving a flimsy membranous layer of Gallaudet’s fascia above the rectus sheath. Preservation of this Gallaudet’s fascia helps to minimise seroma formation. The abdominal skin flap is raised superiorly to the level of the umbilicus with diathermy knife. The major abdominal arterial perforators are carefully identified and ligated. The native umbilicus is dissected with preservation of its neurovascular stalk. Before raising the abdominal flap further, one should then proceed to tumescent SAL of the focal areas of lipodystrophy of the abdomen.
abdominal flap to the xiphisternum and costal margins affords full assessment and proper repair of the entire diastasis of RA (Fig 10).

The medial edges of the diastased RA should be marked before repair. The widest of the diastased RA is usually at or near the level of the umbilicus. The diastased RA is repaired in 2 layers with strong nylon from xiphisternum to pubis. Care should be exercised to avoid strangulating the umbilical stalk. After the repair, the entire abdominal aponeurotic musculature is visually and palpably firm. The width of the waistline is also reduced.

Before proceeding to umbilicoplasty and wound closure, the operating table should break to about 20 degrees to flex the trunk of the patient. This facilitates closure of the wound without tension. A simple 2 cm transverse or V-shaped slit is made for transposition of the native umbilicus to the new opening. The final suturing of the umbilicoplasty is completed in 2 layers.

Wound haemostasis and irrigation with antibiotic solution precede wound closure. A size 10 drain is inserted. The wound closure is done in 3 layers, paying careful attention to the approximation of the upper and lower wound edges. An option is to close the superficial fascia with 40 absorbables, the deep dermis with 40 absorbables and the skin with 50 subcuticular continuous monofilament, preferably colourless. The lateral ends of the wound should be trimmed, extended or contoured with SAL in order to avoid unsightly dog-ears. An inverted T closure should be avoided.

Postoperative Care

The wound is dressed and the entire abdomen is taped to minimise bleeding, seroma formation and post-operative swelling. Adequate analgesia is provided and prophylactic antibiotics are continued for 5 days. The patient is encouraged to ambulate the next day. The drain is usually removed within a week after surgery when the output is under 30cc per 24 hours.

The patient is instructed to use their hands to guard and support their abdomen when they get in and out of bed, and during coughing. This manoeuvre minimises stress to the repaired RA and reduces post-operative pain. A pressure garment is worn for comfort and support for 2 to 3 weeks.

Discussion

Many a time a patient with a slack tummy (diastasis of RA) may deliberately simulate a firmer abdomen by contracting the abdominal musculature voluntarily. This conscious effort is very tiring. In the old days, one solution was to wear a corset. Today after an abdominoplasty procedure, a good contour of the abdomen can be attained even when the patient is fully relaxed without the slightest effort.

In some aesthetic surgeries like Asian blepharoplasty and facial contouring, there is a move towards lesser surgery for greater aesthetic improvements. However good results can only be achieved with radical abdominoplasty for types III and IV severities.

The combination of SAL, dermolipectomy and repair of diastasis of RA all require careful preoperative evaluation and planning. Vessel and lymphatic conserving dissection with minimal undermining and preservation of the Scarpa’s fascia in the upper and lateral abdomen is the key to avoid flap necrosis. SAL should be extensive but selective in the upper abdomen. Diastasis of the RA is repaired radically from the xiphisternum to pubis. The avoidance of excessive skin tension with multiple layer closure minimises skin wound complication and reduces scar formation. All these factors will contribute to and augment the overall aesthetic contour of the abdomen.

References