Chapter 14
Other Approaches for Reducing Surgical Risk

Antonio Sommariva

Risk Factors

Surgery is currently the most effective treatment modality for patients with inguinal lymph node metastasis from cutaneous and genitourinary tumors. All surgeons dealing with groin metastases know that inguinal lymphadenectomy (IL) is burdened by a substantial morbidity including wound infection and dehiscence, seroma, leg lymphedema, and deep venous thromboembolism (DVT). In addressing the issues of how to decrease the risk of complications after inguinal lymphadenectomy, it is important to first define the recognized risk factors and for what types of complications such factors are important. It is also appropriate to bear in mind that often a complication in itself is a risk factor for another complication. For example, it is known that the onset of infection or hematoma in the groin favors the onset of lower limb lymphedema in the postoperative phase. The issue of reducing surgical risk is complex, and the level of evidence of the studies is not always adequate to allow definitive conclusions. In the evaluation of the available literature on morbidity after IL, we should bear in mind that the vast majority of the studies are retrospective and even in those where data collection is prospective in design, a wide range of variation in definition and grading of the complications as well as in the follow-up of the patients is found.

According to the Centers for Disease Control and Prevention (CDC), surgical wound classifications, wounds from superficial lymphadenectomy (neck, axilla, and groin) can be considered as a class I/clean. However, groin dissection is associated with an infection rate relatively higher than that reported after nodal dissections in other anatomic regions [1, 2] and is also higher than that expected for a typical "clean" operation, which ranges between 1 and 5% of cases. One of the potential

A. Sommariva, M.D.
Surgical Oncology Unit, Veneto Institute of Oncology, IOV-IRCCS,
Via Gattamelata 64, 35128 Padova, Italy
e-mail: antonio.sommariva@iov.veneto.it

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Table 14.1 Recognized risk factors for postoperative morbidity after IL

Age
Male gender
Obesity
Diabetes
Smoking
Cardiovascular/pulmonary disease
Tumor burden
Surgeon case load
Radiotherapy
Patient mobilization

explanations is the bacterial load and pathogenicity of the bacterial flora of the groin, which is associated with the difficulty in maintaining adequate hygiene in the folds of the groin, particularly in overweight patients. Contributing factors are the relatively large area of dissection, the density of lymphatic vessels, and the critical vascular supply of the groin skin. The relatively high incidence of wound infection after groin dissection is also related to the higher risk in these patients of other postoperative complications, such as wound breakdown and seroma, which frequently lay the ground and contribute to bacterial contamination of the surgical field. Approximately one-third of seromas lead to infection requiring drainage or drain placement. The microorganisms isolated in the groin include gram-negative rods, *Staphylococci*, diphtheroids, and streptococci. In the same way, an infected wound frequently leads to dehiscence. For this reason, it is difficult to distinguish the process underneath the infection, which is always multifactorial, including several well-known factors (Table 14.1).

Age is an established risk factor for postoperative complications. The reason why older patients are at increased risk of postoperative complications is probably multifactorial, in part related to several associated morbidities affecting these patients. The higher risk of wound complications in older patients can be explained by the deterioration of wound healing with age. Comorbidities, including cardiovascular and/or pulmonary disease and diabetes, have an established association with complications after IL [3]. Diabetes itself, associated with wound problems after several surgical procedures, represents an independent risk factor for wound complications and seroma after IL [1, 4, 5]. Another reason why patients at a later age are more likely to develop complications can also be explained by factors related to postoperative management. It is possible that elderly patients present a later mobilization and that wound care is more difficult and less accurate than in young patients. Moreover, the significantly higher incidence of leg lymphedema observed in patients >50 years can be explained by delayed detection and referral for intervention, despite the knowledge that early diagnosis and treatment play a pivotal role in halting progression and preventing complications of lymphedema [6].

Another significant risk factor for morbidity after IL is obesity. Patients with an increased body mass index (BMI) are at significant risk for wound complications, as seen in several studies. In a multivariable analysis, a BMI of more than 25 was the only factor associated with a higher incidence of wound infection in two single-center studies [3, 4]. A prospective study estimated that a BMI >30 increased the risk of wound complications by more than 11-fold [1]. Moreover, obesity represents a significant risk factor for postoperative lymphedema after IL [6]. Obese patients are at higher risk for lymphedema because they have baseline impaired venous and lymphatic function. As shown in experimental models, the negative effect of obesity on lymphedema is increased after surgery as a result of an impaired lymphangiogenesis [7].

Another factor clearly related to postoperative morbidity is the indication and extent of dissection. In melanoma, IL for clinical disease is burdened by a higher postoperative complication rate (wound infection/dehiscence) and lymphedema compared to completion lymphadenectomy for positive sentinel biopsy [8, 9]. Also, in penile cancer, variables pertaining to the extent of disease burden (i.e., number of lymph nodes, AJCC stage) have been demonstrated to be significantly related to postoperative morbidity [10]. The result is thinner flaps or an increased tension on the wound that can favor skin necrosis and wound dehiscence. Surrogate risk factors for tumor burden are recognized in the length of surgery, the size of the largest lymph node, the transposition of the sartorius muscle, and the number of lymph nodes. This difference might be related to the surgeon's attitude or necessity to be more radical in patients with clinical disease. Regarding lymphedema, the presence of macroscopic disease seems to influence the onset of postoperative lymphedema as well. Patients with positive sentinel lymph node biopsy (SLNB) undergoing dissection (the so-called completion lymphadenectomy) showed a lower incidence of leg lymphedema with respect to those operated for clinically palpable disease [8, 11]. This observation finds two potential explanations. First, patients with clinical disease present an impaired lymphatic drainage due to the greater number of lymph nodes involved, which causes a more pronounced lymphatic obstruction. Second, surgery for clinical disease strives for complete clearance of the affected basin, leading to a greater thoroughness and disruption of lymphatic collaterals during dissection. Also, a more extensive surgery, including the iliac lymph nodes, has been significantly associated with a worse outcome, although this latter factor is still under discussion and is probably secondary to indication (more disease burden) rather than extensive surgery itself [5]. In melanoma, it is not clear whether the addition of deep dissection (i.e., obturator and iliac) could represent a significant risk factor for postoperative morbidity. Morbidity rates seem unaffected by a combined superficial and deep groin dissection, even though chronic lymphedema showed a trend in later onset in one study [12].

Other factors, such as smoking [9, 13], male gender [9], patient mobilization [3, 4], radiotherapy [14], and surgeon case load [15], have been evaluated and should also be taken into account when planning IL.

Preventing Bacterial Infection

Perioperative administration of antibiotics after groin surgery has been considered as a measure to reduce the rate of wound infection. A prospective randomized controlled trial on perioperative use of cefazolin in preventing wound complications after axillary and groin dissection did not show any significant benefit of antibiotic administration on wound complications in the inguinal region [13]. No guidelines are available for if and how long prophylactic antibiotics should be administrated, and the practice varies among centers. Prolonging antibiotics until drain removal or in the presence of undrained hematoma or seroma is not supported by any evidence and could not be recommended as standard of care in clinical practice. Shaving the surgical site, accurate sterilization of the groin before starting the procedure, and placement of drains laterally, as far away as possible from the bacteria-laden skin of the inner thigh, groin and genitals, and anus, all represent a pragmatic approach for limiting the risk of infections. During surgery, a diligent control of lymphatics and hemostasis prevents conditions such as seroma and hematoma that can favor infection. Wound irrigation and removal of any devitalized tissue should also be carried out. After surgery, the wound should be kept clean and dry. In obese patients, the abdomen skinfolds can make wound care problematic and favor excessive moisture of the skin, which becomes an ideal culture medium for pathogens. In this patient subgroup, the application of negative pressure wound therapy (NPWT) systems could be beneficial, although they have never been tested following groin dissection in a properly designed study. Epidermal vacuum dressing consists in a pump connected to a designed dressing which generates a negative pressure of 80 mm/Hg on the skin, allowing removal of fluids away from the wound through a combination of absorbency and evaporation [16].

The Choice of Skin Incision

One of the most effective ways to reduce wound-related morbidity after groin dissection would simply be by avoiding skin incision. Video-assisted groin dissection technique is the most promising and valuable approach towards this goal and is covered in a separate chapter [17].

The choice of the type and length of skin incision should be made with the main aim to permit full access and a direct view of the tumor limits of the inguinal and iliac dissection as well as to guarantee an effective clearance of the lymph nodes and a reliable control of bleeding and lymphatic leak. The type and length of skin incision play a pivotal role in wound morbidity. The ischemia of the skin flaps is the most important factor affecting wound morbidity after groin surgery (Fig. 14.1). Skin necrosis in a body area as the groin—moist and rich in cutaneous folds and bacterial colonization—is often complicated by infection, which can determine prolonged wound healing and eventually an increased risk of lymphedema due to hampered lymphatic regeneration. The blood supply of the groin is maintained by three

Fig. 14.1 Skin necrosis after S-shaped incision during IL

main collaterals: the epigastric artery, the circumflex iliac artery, and the external pudendal artery [18]. These arteries are generally transected by the classic vertical incision creating cutaneous areas at risk of ischemia. These small branches lie in the Camper fascia and tend to be parallel to the skin creases and the inguinal ligament. One surgical principle derived from these anatomical landmarks is that particular attention should be paid in preserving the Camper layer during flap preparation, avoiding lesions of the microvascular arterial plexus. Skin flaps should include at least 2–3 mm of subcutaneous fat and then become thicker as the base of the flap is reached. A careful skin flap preparation plays an important role in preventing wound edge ischemia, and particular attention should be paid in the case of obese patients with multiple redundant skinfolds in the groin [19]. At the end of dissection, the skin edge should be systematically checked and any ischemic area resected. Excision of at least 4 cm width of skin showed a significant lower rate of early complication with respect to excision of little or no skin [20]. New technology, such as intraoperative indocyanine green fluorescence angiography, is effective for visual assessment of tissue perfusion, and its application during IL seems a promising tool for preventing wound necrosis and dehiscence [21].

Regarding the type of incision, it is well recognized that the vertical or S-shaped skin incision leads to a greater risk of skin devascularization [22]. Oblique incisions, parallel to the inguinal ligament, transect fewer anastomotic vessels than vertical ones, preventing flap necrosis. Oblique incision allows good exposure for the iliac and obturator area, and, in case of radical vulvectomy or penectomy, the medial part of the incision can easily be extended if an en bloc resection is needed. With oblique incision, the access to the apex of the femoral triangle is sometimes problematic, and exposure with retractors (even if lighted) under the lower skin edge may cause damage of the microcirculation, increasing the risk of necrosis. Moreover, an oblique incision does not always allow complete exposure of the surgical field, and it is not uniformly adopted by surgeons performing groin dissection. A single incision below the inguinal ligament, more proximal to the apex of the femoral triangle, does not show a significant benefit over a single incision above [23]. In cutaneous tumors of the lower limb, where an optimal clearance of the distal inguinal nodes is mandatory, a double incision technique has been proposed. Adopting two separate oblique incisions, below and above the inguinal ligament, allows a better exposure of the distal portion of the femoral triangle and represents a good surrogate to single longitudinal incision. Although no significant advantage with respect to the vertical incision is demonstrated, the double incision technique can be useful in some cases where wound healing is considered at risk for previous surgery or in the presence of multiple risk factors [24].

Lymphatics and Vessel Control

Seroma formation (lymphocele) represents the most common complication after groin dissection. Meticulous control of lymphatic vessels during dissection is pivotal in preventing postoperative seroma. After sentinel lymph node biopsy (SLNB), lymphovascular control with Ligaclips is associated with a better postoperative outcome compared with diathermy use [25]. Although a longer operative time is expected, multiple small ligations with absorbable suture or clips are essential. Clip ligation carries minimal risk to surrounding structures; however, they may be dislodged during dissection and only offer a control of macroscopic vessels with minimal effect on the microscopic vascular and lymphatic network.

More recently, new devices have been tested for lymph node dissections, the most popular based on ultrasound or radiofrequency energy delivery. The hypothesis is that by reducing the thermal-induced injury and secondary inflammation on tissues and by complete sealing of vessels and lymphatics, postoperative morbidity could be reduced compared to the classic "electrocautery/clips" technique. Ultrasonic dissection devices are expected to seal vessels by denaturing hydrogen bonds and sealing the vessels with a coagulum. Radiofrequency devices use bipolar energy by denaturing the collagen and elastin in the vessel wall into a permanent seal. Ultrasonic scalpels (USS) and radiofrequency scalpels (RFS) are widely used in laparoscopic surgery, to minimize smoke and collateral damage during tissue dissection and to maintain adequate vascular control. These devices have been shown to produce less thermal injury in animal studies, and it is postulated that their use for lymphatic dissection might reduce bleeding, postoperative drainage, and seroma development. In small comparative studies of lymph node dissection in breast cancer lymphadenectomy, USS showed controversial results in terms of lymphatic fistula, lymphocele, and hematoma. In RCTs of axillary dissection for breast cancer, lymphadenectomy with USS was able to significantly reduce the serous drainage and hospitalization stay [26, 27]. In patients undergoing axillary or inguinal lymphadenectomy, a recent prospective randomized trial failed to show any significant reduction of complications (seroma, hematoma, and surgical site infection) between dissection with USS and ligation/monopolary electrocautery [28]. Also, operative time and length of hospital stay seem similar, although lymphedema was significantly higher after US dissection. The reasons for this should be further investigated, but a hypothesis could be that USS leads to a more efficient sealing of lymphatics with subsequent more evident lymphatic stasis in the limb. There is just one single study comparing USS, RFS, and electrocautery and clip application after SLNB for melanoma [29]. This study showed a significant reduction after RFS use on incidence of lymphocele compared with electrocautery and clip application or USS. The effectiveness of USS and RFS for IL is far from being definitely proven, and prospective comparative trials are necessary. These studies should be designed not only comparing the results in terms of morbidity but also considering the cost for healthcare systems of these new devices.

Fibrin sealants (FS) have been proposed as a potential method to reduce lymphatic leak after lymphadenectomies. Fibrin sealant or fibrin glues are hemostatic agents derived from plasma. They are composed of a solution of several molecules in different combinations (thrombin, fibrinogen, aprotin, fibronectin, and human factor XIII) that essentially replicate the final step of coagulation cascade, stop fibrinolysis, and reinforce the clot. A meta-analysis of six RCTs did not show any significant advantage of FS over standard closure in patients undergoing groin dissection [30]. This finding is in line with a similar analysis on FS use after breast and axillary surgery [31]. We should also consider the relatively high cost of FS and the potential risk (although never observed) of transmitting infective agents as they derive from pooled human plasma. Nevertheless, due to their simplicity of use and their low toxicity, they are still adopted in many centers. Further studies are needed with a larger sample size and better methodological quality before a definitive conclusion on their utility after IL can be made.

An interesting and innovative field is the application of microsurgical lymphatic-venous anastomoses (LVA) performed simultaneously with groin dissection in primary prevention of lymphedema [32]. In preliminary experiences, no lymphedema occurred after microsurgical primary lymphovascular anastomosis. The technique consists in direct anastomosis between lymphatics distal to the inguinal node and a collateral branch of the great saphenous vein. After blue dye injection, lymphatics are visualized and isolated cranially to the inguinal nodes, closed by titanium clips, cut from nodal capsule, and prepared for anastomosis. The main concern related to lymphovascular anastomosis in patients with groin lymph node metastases is the potential danger of diffusion of cancer cells between the lymphatic system of the leg and the trunk and the systemic blood circulation. Further research is needed to investigate this approach in terms of costs and operative times as well as in terms of oncology outcomes.

Saphenous Vein Preservation (SVP)

This technique was first described in 1988 [33] and consists in the isolation of the vein along its entire course in the apex of Scarpa's triangle up to the junction with the femoral vein, obtained through the meticulous ligation of all the tributary vessels. Preservation of the SV appears to reduce the cost and morbidity of IL [34].

In some comparative studies, both retrospective and prospective [35–38], the technique proved to consistently reduce the incidence of postsurgical lymphedema, especially long-term lymphedema (after 2 years). These data have been confirmed by a meta-analysis, which showed a significant reduction of lymphedema in the SVP group (odds ratio 0.24; 95% CI 0.11–0.53) [39]. In the same analysis, wound-related complication rates (infection and dehiscence) also seem to be lower (odds ratio 0.4; 95% CI 0.16–0.96 and 0.34; 95% CI 0.19–0.59), retrospectively. In one study, SVP also showed a lower occurrence of lymphocele [38]. However, the incidence of DVT is similar with the classic approach. Available data show that SVP is a relatively simple technique, which does not stretch operating time nor is associated with a greater blood loss. From an oncology point of view, SVP guarantees the excision of an equivalent number of lymph nodes, and the recurrence rate is similar to that of the vein ligation technique.

No clear explanations can be found on how the preservation of the saphenous vein may prevent lymphatic stasis after IL. Limb lymphedema is a morbid condition characterized by a difficult discharge of interstitial fluids. The preservation of the most important superficial vein of the leg can partly compensate for the accumulation of fluids that find an alternative way of drainage. Moreover, the better trophism of the skin ensured by a more adequate venous drainage and less edema can also explain better results in terms of infection and dehiscence. Moreover, a more meticulous dissection with multiple ligation can probably account for the lower incidence of seroma observed in one study.

The exact mechanism through which preservation of the saphenous vein can determine less lymphedema is not clear. In patients undergoing vascular bypass procedures in whom SV is entirely or partially disconnected, the simple loss of the SV rarely leads to significant lower extremity edema [40]. Chronic venous insufficiency can affect lymphatic function in the lower limb. The delay of lymph flow may correlate with the severity of clinical venous disease and/or the magnitude of venous reflux. Moreover, a dilated saphenous vein and/or varicose vein of their tributaries may directly obstruct flow through the lymph vessels. These phenomena are in general reversible with surgical treatment of venous incompetence making the hypothesis of SVL as direct cause of lymphedema after IL uncertain [41]. The mechanism underneath the venodynamics and lymphodynamics in the leg after groin dissection interacts as an unpredictable and mutually dependent outflow system. After saphenous vein ligation, the balance between the two systems is probably lost. Venous permeability due to capillary hyperpressure leads to an increased infiltration and edema. Under this situation, the impaired lymphatic system secondary to the lymphadenectomy cannot compensate the interstitial fluid overload, and clinical lymphedema may occur. The effects of disrupted groin lymphatic vessels can be overcome by preservation of the SV.

On the basis of these data, the preservation of the saphenous vein is capable of reducing the risk of lymphedema and other complications and can be recommended, especially in the presence of patients with established risk factors (obesity, previous irradiation of the groin). It must take into account, however, that the SVP is not feasible in patients with large tumor load due to the risk of an inadequate tumor dissection and, in any case, where an obvious infiltration of the vessels by a metastatic lymph node or scars from previous surgery (SLNB) is present.

Preservation of the Fascia

In the classic description of IL, the fascia overlying the sartorius, adductor longus, psoas, and external oblique muscles is excised en bloc with the fibro-fatty tissue of the groin. The rationale to remove the deep fascia performing dissection in the avascular plan outside the fascial layer is mainly oncological, aimed at reduces the risk of local recurrence in the groin. Preservation of the muscle fascia has been tested in a single study after axillary and groin dissection [42, 43]. The incidence of long-term leg lymphedema appears low (14%) without any evidence of higher risk of local recurrence with respect to similar published reports. The reason why the preservation of muscle fascia leads to a lower occurrence of postoperative leg edema is not fully understood; preservation of the lymphatics under the fascial layer is demonstrated and visualized after intraoperative injection of lymphazurin blue dye. Moreover, preserving the fascia probably causes less scarring in the area of muscle dissection, favoring better lymphatic flow and regeneration.

Another important anatomic structure in the groin is the fascia lata, which separates the deep inguinal lymph nodes (underneath) from the superficial inguinal nodes (above). Preservation of this fascial structure is possible and seems associated with a lower morbidity profile, including wound-related complications (infections, skin necrosis), seroma, and leg lymphedema. The technique has been tested in inguinal lymphadenectomy for vulvar and penile carcinoma and is associated with a limited clearance of distal and later lymph nodes of the groin [44–46]. Although preserving the fascia lata represents a good compromise for groin lymphadenectomy in genital tumors, where dissection is also aimed for staging purpose, for skin cancers, it does not allow complete clearance of all the potentially metastatic lymph nodes of the groin, and, for this reason, it is never performed for this indication.

Table 14.2 Reconstructive options after IL

Skin grafts
Gracilis or sartorius muscle transposition
Omental flap
Tensor fascia lata flap
Anterolateral thigh flap
Rectus abdominis flap
Rectus femoris flap

Flap Procedures

In an attempt to reduce wound-related morbidities, several reconstructive surgical procedures are used after dissection, mainly when the risk of skin edge necrosis is judged to be very high or a primary closure of the wound is impossible (Table 14.2). Primary reconstructive procedures are generally considered in the presence of bulky disease with suspicious areas of skin infiltration, skin ulceration, previous irradiation of the groin, or systemic chemotherapy. The primary advantage of flap closure of the groin is the protection of the femoral vessels in case of dehiscence. Exposure of the femoral vessels represents a surgical emergency that should be avoided whenever possible. In the presence of extensive skin infiltration, these techniques allow a wound closure without tension. Moreover, the flap procedures allow the covering of the dead space in the femoral triangle preventing seroma. The use of flap procedures should always be tailored to each patient and clinical situation (skin infiltration, previous radiotherapy, and other patient-related risk factors), preferring the simplest technique over more complex techniques.

Skin grafting is sometimes necessary when a large portion of the skin should be resected. The cutaneous edges are sutured to the deep layers, and the residual wound defect is covered by split-thickness skin graft. Sartorius muscle transposition (SMT) was first introduced in 1960 to protect the femoral vessels in case of wound dehiscence [47]. The technique is relatively simple; the muscle is detached from its proximal insertion, rotated medially over the femoral artery and vein, and fixed to the inguinal ligament and adductor muscle with interrupted sutures. In the presence of wound breakdown, the muscle gives reliable protection for the underlying vessels avoiding additional surgery in most cases. The role of SMT in preventing wound-related complications (infections, seroma) itself is less clear. A small randomized controlled trial did not show any benefit of SMT in preventing wound-related morbidity [48]. No statistically significant differences were observed in the incidence of wound cellulitis, wound breakdown, lymphedema, or rehospitalization. Paradoxically, the incidence of seroma was increased in the SMT group. Data coming out from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database showed that SMT is used in 16.5% of patients undergoing lymphadenectomy for melanoma, more frequently after inguinoiliac dissection with respect to superficial (inguinal only) [49]. In this study, SMT is associated with a significantly longer operative time: 228 versus 168 min in inguinoiliac dissection and 181 versus 120 min for inguinal dissection. A similar wound complication rate has been detected between patients treated with SMT and those who were not, but when accounting for operative time, SMT group showed fewer complications compared with the non-SMT group. If we consider operative time as a surrogate of disease extension, these data suggest that SMT is potentially able to reduce morbidity in high-risk patients. For these reasons, SMT after IL should be used selectively, mainly for patients with established risk factors for wound complications, first and foremost obesity. SMT can be omitted in all the cases where the skin incision does not directly overlie the vessels, as in the case of a completion lymphadenectomy after sentinel lymph node biopsy. The application of sartorius tendon transposition has recently been proposed as a variant of SMT [50]. Transposition of the tendon obviates the need to cut and skeletonize the muscle, avoiding damage to the lateral femoral nerve (cause of persistent sensory disturbances) and lowering the surgical trauma in the inguinal area. A case-controlled study comparing classic SMT with sartorius tendon transposition showed that tendon preservation is associated with a lower incidence of wound dehiscence and lymphedema as well as a better quality of life. This technical variant, although promising, should be further evaluated within a prospective randomized trial.

Omentum flap is another technique aimed at limiting postoperative morbidity, mainly lymphedema by emptying the dead space in the femoral triangle, covering the femoral vessels after IL [51, 52]. Omentum is mobilized beneath the inguinal ligament, using a double incision, inguinal and abdominal, allowing a passage throughout the femoral canal. The flap, once in the groin, is fixed to the myofascial edges with interrupted sutures. Although preliminary results are encouraging, mainly for lymphedema, omentoplasty is not widely adopted by surgeons performing IL, and the current available literature is limited to a few pilot studies.

In more complex cases, pedicled myocutaneous flaps can be considered [53]. This kind of surgery should be planned in advance, after a thorough evaluation of costs and benefits, patient consent, and in centers where good skills of advanced plastic surgery techniques are available. Pedicled flaps within single-stage procedures are generally preferred over free flaps for their relative simplicity; they provide a good functional and cosmetic result and resistance to postoperative radiotherapy. The donor site morbidity rate is acceptable, but sometimes flap necrosis or infection may occur. A balanced comparison in terms of aesthetic and functional outcome between different flaps needs additional investigation.

Postoperative Care

A careful postoperative management assumes importance comparable to that of surgical techniques used to decrease the risk of complications. It is important to perform a thorough and daily monitoring of the surgical wound, avoiding fecal contamination and removing the bladder catheter only once the patient is able to mobilize from the bed autonomously. Epidermal vacuum dressing showed encouraging results in preventing wound complication after IL, but the efficacy and cost-effectiveness should be better investigated in the near future [16]. Some groups advocate bed rest to reduce surgical morbidity. In one retrospective study, the incidence of wound necrosis is inversely correlated with bed rest and with flexion of the hip and knee [3]. However, in another study, an early mobilization after 5 days IL does not increase the risk of complications [4]. No clear evidence is available as to when it is safe to mobilize the patient after groin dissection. Generally, it is preferred to extend the bed rest when myofascial flaps have been used to allow their engraftment without problems of dehiscence. During the postoperative period, a proper management of the antithrombotic prophylaxis is necessary and must be based on the use of low molecular weight heparin and antithrombus elastic stockings.

At the end of IL, most surgeons place one or more suction drains in the wound. This policy allows blood, reactive fluids and lymph to be drained away, maintaining the dead space of the groin empty. No evidence is available that indicates whether the positioning of a suction drain after IL consistently prevents postoperative complications. The risk of occurrence of an infection is paradoxically increased, as is clearly shown as drainage facilitates the entry of bacteria into the wound, in proportion to the time in which it is held in place. An early removal of drainage, which is typically volume directed (when the output is 30–50 mL in 24 h) or time directed (1 week irrespective of the drain output), is always advisable. The evidence on how to handle drains after IL for malignant disease remains minimal, and no clear guidelines on management can be supported [54]. A prospective trial would be useful to evaluate the real impact of drains use after groin lymphadenectomy. Some RCTs in pelvic lymphadenectomies suggest that the use of drainage after pelvic surgery is not required. Meanwhile, it would be appropriate that each center assess in a critical sense the appropriateness of using drainage in the groin, avoiding their use after combined pelvic lymphadenectomy.

In the early postoperative course, a proactive prevention program for lymphedema should be planned for each patient. In case of persistent and untreated postoperative leg edema, fibrotic process may occur secondary to stagnation of lymph, which worsens lymphedema and makes any further interventions useless. Programs for preventing postoperative lymphedema include an early use of elastic wraps, slow ambulation, and strict leg elevation when the patient is not ambulating. Upon the first sign of lymphedema, the patient should be immediately referred for massage therapy and compression stockings. Leg measurements should be routinely performed by the specialist engaged in follow-up of patients, as the first onset of lymphedema can be delayed, even after 12–24 months.

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