SYNOVECTOMY

Synovectomy is an operation performed to remove partial or all the synovial membrane of a joint. The procedure is either by classic arthrotomy or arthroscopy.

Arthroscopic synovectomy has many advantages over open synovectomy: including minimal invasive surgery, short hospital stay, diminution of postoperative joint stiffness, and better complete synovectomy. Arthroscopy allows for a more accurate diagnosis and facilitates the ability to ascertain small, localized areas of synovitis. In an arthroscopic procedure, the excision can be restricted to the areas of involvement in the localized form. When total synovectomy is indicated, an experienced arthroscopist can more adequately perform a total synovectomy than an open Arthroscopy.

SURGICAL TECHNIQUE

Five or six arthroscopic portals are used in a complete arthroscopic synovectomy: lateral and medial suprapatellar, anteromedial, anterolateral, posterolateral, posteromedial.

A 5mm diameter arthroscope is used with a motorized shaver with a 5.5-mm diameter resector is inserted through these portals.

This is a very demanding technique requiring to respect a step by step technique not to under resect synovial membrane an to prevent any damage to vascular or nervous elements around the joint specially at the posterior compartments.
Synovectomy is usually performed in the following sequence:
(1) intercondylar notch (to make a gateway for posterior compartments),
(2) posterolateral compartment,
(3) posteromedial compartment,
(4) medial compartment,
(5) lateral compartment,
(6) suprapatellar compartment,
(7) retropatellar compartment.

At the anterior compartments, we examine the undersurface of each meniscus with great care.
In case of popliteal cysts communicating with the joint, it is appropriate to proceed with a combined arthroscopic treatment, or to remove the popliteal cyst through an open posterior approach after the arthroscopic synovectomy.

After completing the synovectomy and releasing the tourniquet, bleeding control is achieved with electrocautery. A compressive dressing is applied.

Postoperatively, the intra-articular suction drain is removed 24 hours after surgery.

The patients began physical therapy (passive range of motion and isometric quadriceps contraction exercises) the same day to achieve maximum range of motion, restrengthen the quadriceps and hamstring muscles, and use modalities to decrease the swelling, pain, and inflammation in the acute postoperative period.

INDICATIONS

Indications are limited:
- synovial tumors: Pigmented Villonodular Synovitis
- inflammatory arthritis: Rheumatoid, chondromatosis, hemophilia
- septic arthritis
- stiffness

Synovectomy is indicated before cartilage damage.

PIGMENTED VILLONODULAR SYNOVITIS

Pigmented villonodular synovitis is benign despite the high risk of recurrence. Preoperative MRI is successful in providing the correct preoperative diagnosis.

Multiple studies have shown that patients who have had excision for localized PVNS do well with recurrence rates being very low. There is considerable controversy regarding the treatment of diffuse form of PVNS as recurrence rates vary greatly from 8%-46%.
There are two factors associated with a greater incidence of recurrence: the diffuse type of PVNS and the location in large joints. However, despite recurrence, surgical treatment of PVNS leads to good functional results.

Generally, PVNS is only treated operatively but surgery can be combined with adjuvant treatments such as Radiotherapy, or colloidal chromic P32 synoviorthesis to treat inaccessible or hidden disease sites and to reduce the risk of disease recurrence. (However, there is the risk of adverse effects such as skin damage, infection, or Stiffness).

CHONDROMATOSIS

It is likely a process caused by hyperplastic metaplasia of the synovial tissue. Some of these focal, metaplastic, cartilaginous areas give rise to pedunculated masses that detach in time, resulting in cartilaginous or osteocartilaginous, loose bodies within the joint cavity.

The disease process has been classified into 3 distinct phases by Milgram:
1) The early phase involves only the synovial membrane, with metaplastic islands of cartilage in the synovium without any loose bodies. A decreased tendency for calcification is seen.
2) The transitional phase shows both active, intrasynovial proliferation of the cartilaginous masses and also free, loose bodies. Calcifications begin in the center of these masses.
3) The later phase demonstrates only the free, loose bodies, without any evidence of synovial metaplasia but occasional, slight inflammation. These loose bodies have a tendency to calcify.

Generally, in early stages only, synovectomy is adequate. Synovectomy, together with loose body removal, is indicated in the transitional stage of the disease. For later stages, generally, arthroscopic loose body removal is enough.
HEMOPHILIA

Patients with hemophilia A or B with recurrent hemarthroses despite appropriate prophylactic therapy may need synovectomy as recurrent hemarthroses have a deleterious effect on the synovium and the articular cartilage. Persistent bleeding causes:
- synovial hypertrophy and inflamed and friable synovium.
- Hemosiderin deposition in the surrounding phagocytic cells of the synovium and in the cartilage itself.
- Fibrinolytic and other hydrolytic enzymes released from lysosomal stores degrade the organized clot and articular cartilage.
- The nondegraded organized clot induces the formation of fibrous adhesions that can severely limit joint motion.
- epiphyseal overgrowth due to increased blood flow to the physis. This can cause joint malalignment of the limb.

Open techniques were complicated by a reduced range of motion. Arthroscopic synovectomy has been shown to be just as effective in reducing the number and severity of the hemarthroses, but usually maintains or increases the ROM of the affected joint.

RHUMATOÏD ARTHRITIS

Synovectomy reduces acute inflammation of synovial tissue in RA. Because the highest rate of success, defined as clinical improvement or delay of radiologic progression, has been observed in patients with limited radiologic changes, synovectomy is recommended in early stages of the disease. The degree of clinical improvement and the postoperative prognosis of synovectomy appears to depend on the histologic composition of the rheumatoid synovial tissue, and the extent of synovial tissue removal.

Knee joint scores after synovectomy show a significant improvement over preoperative values at follow-up.

INTRA-ARTICULAR INFECTION

Synovectomy is a possibility in case of chronic infection as tuberculosis.

Synovectomy and débridement with prosthesis retention and parenteral antibiotics is a therapeutic alternative for the treatment of an infected prosthesis. This will be proposed in two cases:
- acute postoperative infection that occurs within the first 4 weeks after implantation of a prosthesis
- acute hematogenous infection of a joint arthroplasty that previously was functioning well with no radiographic abnormalities
CHECK-UP BEFORE SURGERY

In order to detect vital risk for anesthesiology, and to assess a potential risk of post-operative complication in a short or long term follow-up, a medical questionnaire checking list is needed before the operation, to be planned by the surgeon and his team.

COMPLICATIONS

Even with a careful act performed by perfectly trained team, any complications may happen the same as in every surgical act. These are exceptional; The list below is not exhaustive.

- Infection is one of the most dreaded complications. The efficacy of prophylactic measures and risk factors play an important role. Prophylactic measures: laminar flow, body suits, drains, surgical time (length), the use of preoperative antibiotics.

- Detection and treatment of risk factors: Obesity, diabetes, pre-op treatment of dental or urinary infection.

- Neuro-algodystrophy: rare (1 to 3%) but impossible to plan (except in case of previous episode) and difficult to treat.

- Partial nervous palsy: in case of traumaism of the sciatic nerves or in case of prolonged compression by tourniquet.

- Phlebitis: preventive measure (early mobilisation, anti-thrombotic socks, low Weight Molecular Heparin anti-embolic prophylaxis for 6 weeks) and systematic echodoppler control at 7th day allow the risk to be minimize; in case it happens, an anticoagulation treatment is started and rehabilitation is slowed.