SIMULTANEOUS VERSUS STAGED BILATERAL JOINT ARTHROPLASTY
perioperative risk comparison

A significant number of patients (15% to 25% of patients for Lazansky) with severe endstage degenerative joint disease have symptomatic bilateral joint affliction, necessitating joint replacement in both knees. (Cohen, Gradillas) and hips (Ritter-Camissa).

But concerns have been expressed about the increased incidence of deep-vein thrombosis (Salvati), heterotopic ossification (Ritter), a reduced range of movement (Ritter) a suboptimal gain in walking ability (Wykman) and the mortality and morbidity in patients with medical problems. (Shih)

The potential advantages of simultaneous bilateral THA and TKA include a single anaesthetic, a limiting invasive surgical procedure and anesthesia to a single event and promoting symmetrical rehabilitation of both knees, potentially reducing the length of the hospital stay and thereby the hospital costs associated (Ritter, Wykman, Salvati, Alfaro-Adrian, Cohen, Gradillas, Jankiewicz).

Looking at literature, comparisons between main possible complications may be reported regarding with specific items:

INTRA-OPErATIVE COMPLICATIONS AND OPERATING TIME

They seem to be the same and there is no more difficulty to position the implants. Berend report more secondary dislocation rate after hospital discharge related to acetabular positioning of the second hip surgery.

SURGICAL COMPLICATION

No difference has been published
BLOOD TRANSFUSION REQUIREMENTS

The rates of blood transfusion in simultaneous bilateral TKA have been found to be greater than those in unilateral arthroplasty groups. (Lane, Adili, Bullock). The same for THA for Salvati. Bould and Goulet suggested the use of a reinfusion drainage system in addition to preoperative autologous blood collection to deal with the increased demand for blood in simultaneous bilateral TKA. Preoperative use of erythropoietin may also help to reduce the increased blood transfusion requirement in simultaneous bilateral TKA, (Keating).

DEEP VEINOUS THROMBOSIS AND PULMONARY EMBOLISM

Earlier studies have observed higher rates of deep vein thrombosis (Cohen, Wapner) whereas some recent studies have found it to be lower after simultaneous TKA arthroplasty. (Lombardi AV, Bullock DP, Soudry M, McLaughlin).
Barrett concluded that the risk of developing symptomatic pulmonary embolism in patients with simultaneous bilateral procedures is 80% higher than in those with staged bilateral or unilateral knee arthroplasty; he provides the option to the patient of undergoing the second TKA depending on the result of the first surgery.

Recent randomised studies have compared the incidence of DVT and pulmonary embolism in single-stage and two-stage bilateral THA and have found no difference between the two approaches. (Alfaro-Adrian J, Eggi S). Ritter attributed this to improvement in anticoagulation therapy and to early post-operative mobilisation.

SYSTEMIC COMPLICATIONS (CARDIOPULMONARY, NEUROLOGICAL)

Alfaro-Adrian reported a higher incidence of peri- and post-operative complications in patients with significant co-morbidities (ASA grade 3 and grade 4) whether the operation was staged or conducted as a single procedure. (Lynch, Lane, Adili A, Hutchinson, Lombardi) reported higher cardiopulmonary complications (229% of bilateral procedures compared with 6% of unilateral procedures for Lynch) and suggested that simultaneous bilateral knee arthroplasty should be avoided in patients older than 80 years due to a higher rate of complications observed in these patient groups. Patients older than 70 years who underwent simultaneous bilateral TKA and had preexisting comorbid factors have been correlated with higher mortality in bilateral procedures. (Lombardi, Lynch, Bullock, Pavone, Leonard, Ritter, Mantilla).
RADIOLOGICAL FINDING

Observations published suggest that positioning of the component is not compromised during the simultaneous procedure. The survival was also similar in the two groups.

POST-OPERATIVE REOPERATION

The reoperation rate in the study of BEREND was significantly higher in the simultaneous group, with a wound complication / infection rate of 1.8%. This is in direct contradiction to the work of Parvizi and Salvati who demonstrated no difference in complications between simultaneous and unilateral staged THA. This may be explained by the use of the lateral decubitus position when comparing the lateral approach of Parvizi.

FUNCTIONAL BENEFIT

The surgical procedure-related outcome measured with simultaneous bilateral TKA surgery, like satisfaction rates and pain scores, functional and radiographic knee scores and prosthesis survivorship, have been observed to be comparable with those of unilateral or staged knee replacements. (Lombardi, Dorr, Ritter, Soudry, Worland, Benjamin J, Patil)

In patients with severe bilateral knee deformities undergoing simultaneous bilateral TKA, it is more convenient and beneficial for the patient to undergo symmetrical rehabilitation of both knees rather than having a cumbersome rehabilitation regime with corrected deformity on one side and not the other should the patient undergo a staged procedure.

HOSPITAL STAY

The mean duration of hospital stay was significantly shorter in the one-stage group than in the two-stage THA patients (Salvati, Shih, Alfaro-Adrian, Bhan).

Patients can undergo rehabilitation for TKA of both knees in a single hospital stay, thus effectively making the hospital stay less than the cumulative hospital stay of 2 separate procedures. (Stanley, Patil).
CONCLUSION

Most studies report higher complications in elderly patients (>70 years) and in patients with comorbid factors; it may be considered unsafe in this group of patients.

On the contrary, it may be a safe option in younger patients without preoperative comorbid factors; they may benefit of all the advantages of a single anaesthetic, a limiting invasive surgical procedure and anesthesia to a single event and promoting symmetrical rehabilitation of both knees or hips, potentially reducing the length of the hospital stay and thereby the hospital costs.

Bilateral simultaneous surgery of UNI knee arthroplasty seems to be safe and may be recommended.

Bilateral simultaneous procedure of TKA and THA may need appropriate patient selection. The importance of intraoperative monitoring of cardiorespiratory parameters, maintenance of intraoperative normothermia and fluid and electrolytes balance, practicing the proposed intraoperative measures to prevent embolic events, judicious management of blood loss, and postoperative care are the main point to be emphasized before deciding a one stage procedure.

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2009 january 5th