



CASE REPORT

Van Ness Surgery in Osteosarcoma of the femur.

Case report with more than 5 years of evolution with literature review

Dr. Leonardo Fornasin^{1*}, Dr. Carlos Andrés Lores².

¹Medical School 2007, Hector. A. Barcelo; Orthopedics and Traumatology 2014; Specialist Member in the Argentine Association of Orthopedics and Traumatology 2017; Oncological Orthopedic Surgery and Limb Salvage at Lmbanaco Medical Center next to Pontificia Universidad Javeriana Cali 2019. Evaluation and Treatment of Pain, Italian Hospital of Buenos Aires 2023. Neuquén, Argentina.

²Medicine and Surgery 2001, Universidad del Valle, Cali, Colombia; Orthopedics and Traumatology 2007, Valle University Hospital, Universidad del Valle. Cali, Colombia; Oncological Orthopedics and Reconstruction with bone transplants. 2009. Italian Hospital of Buenos Aires. Buenos Aires, Argentina.



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ABSTRACT

Patient 17 years old, diagnosed with osteosarcoma in right distal femur, stage IIB (MusculoSkeletal Tumor Society), without distant bone involvement, multiple personal history, received chemotherapy treatment presenting a low percentage of necrosis with complications, it was decided to perform Van Ness surgical technique in 2018, technique in which resection is performed in tumor block plus rotationplasty, describing its importance in our patient and how this surgery allows greater adaptability to their daily life both social, family as well as school, using Toronto Extremity Salvage score for evaluation.

Key words: Van Ness surgery, rotationplasty at 5 years of evolution.

Introduction

Van Ness surgery or rotational plasty is an option for limb salvage in patients with aggressive tumors, with involvement of both bone tissue and soft tissue, located around the knee, without distant metastasis. The first description of the technique was by Borggreve who performed the procedure in a 12 year old patient suffering from tuberculosis (1927)¹. Later it was made known by the Dutch orthopedist Cornelis Pieter Van Ness in children with congenital limb deficiencies in the 1950s, and was subsequently performed by other orthopedists.

The main objective of rotation plasty is to improve the adaptability and mobility of a patient who would have to undergo a tumor resection with subsequent sequelae of a supracondylar amputation, leading to a biological infra patellar amputation after en bloc resection of the tumor.

The optimal treatment of this type of oncological pathologies starts with an accurate diagnosis that includes a thorough anamnesis, physical examinations, complementary studies with biopsy of the tumor, definition of tumor excision as well as its extension². In our case, after Van Ness surgery in 2018, the patient allowed us to perform the rehabilitation of an infrapatellar amputation, starting from the basis of a stage IIB osteosarcoma of the distal femur with periodic controls after surgery, allowing to observe from a clear perspective the evolution and functionality of this surgical technique, through the achievements and difficulties of the patient described from "The Lower Extremity Tess Questionnaire" more than 5 years post-surgery³. It is important the accompaniment of the medical staff and the rehabilitation team, both for the patient and the family to face the surgical and post-surgical context, in aesthetic-visual aspects as well as psychosocial ones.

CASE REPORT

Female patient of 12 years of age who was admitted to the Orthopedic Oncology service on June 23, 2018 with pain in the right distal femur, functional limitation, increased volume in the thigh, without documented fever.

On physical examination, she presented with pain on palpation, limitation in flexion with full extension, mass of hard consistency, painful, irregular, non-mobile, adherent to deep planes, without vascular network, local heat, or hyperemia. She reported a history of tuberous sclerosis, epilepsy, intracardiac rhabdomyoma, multiple vertebral hemangiomas, denied allergies. Bone scintigraphy showed radioisotope uptake in distal femur, CT lung with 3 pulmonary nodules of less than 5 mm.

The patient with a biopsy diagnosis of osteosarcoma, stage IIB (Musculoskeletal Tumor Society,) underwent neoadjuvant chemotherapy with poor response, presenting in such treatment pathological fracture evidenced by X-ray and MRI (Figure 1), it was decided to undergo surgery with Van Ness rotationplasty surgical technique. On 08/13/2018 osteotomy was performed plus in block resection of the tumor in the right distal femur knee, in which lesion free edges were achieved (Figure 2), Popliteal lymph nodes negative for malignancy. We proceeded to rotate the extremity 180 degrees with reimplantation of the distal remnant limb, preserving the arterial and venous irrigation unharmed with a satisfactory reduction and femoro-tibial osteosynthesis (Fig. 3).

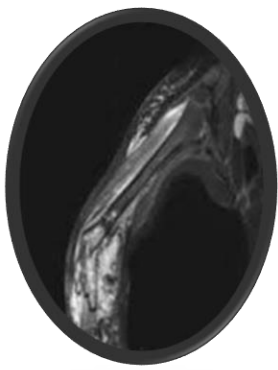


Fig. 1



Fig. 2



Fig. 3

Fig. 1. Pathological fracture of the right distal femur.

Fig. 2. En bloc resection of the knee tumor.

Fig. 3. Reduction and femoro-tibial osteosynthesis.

Subsequent controls

- March 2022 Chest CT: Comparative analysis was performed with previous chest CT of April 2019, where eventual micronodules no larger than 3 mm were still observed in both lung fields, very few and scattered, they have not increased in number and/or size, remaining stable.

Lung density was observed within normal parameters in both fields, without evidence of infiltrates, masses or pleural effusions.

- November 28, 2022, X-ray of the right femur and tibia with generalized decrease in bone density probably due to the prolonged period of rest and lack of support of the limb (figure 4), osteosynthesis material plate-screws is observed in correct position with consolidation of the proximal diaphysis of the femur with the middle diaphysis of the right tibia. Absence of proximal fibula, metallic suture staples, preserved coxofemoral and tibio-fibulo-talar relationship. X-ray projections did not show any alterations suggesting tumor recurrence (figure 4, 5, 6).

- June 2023: Improvement in ambulation with the orthosis (figure 9), with casual help of crutches, denies pain, refers to feeling well without being medicated, states that she wants the orthosis, which could be adapted to the patient through the Van Ness surgical technique, thus rejecting

amputation. There were difficulties in the adaptation of the orthosis, in continuous follow-up by physiatrist.

- Last laboratory, July 2023, where Hemogram, LDH, FA were evaluated and were within normal parameters, joint follow-up with Hemato-oncology.



August 2018.



November 2022.



June 2023

Based on the Toronto Extremity Salvage score performed on 02/20/2024 within the context of our patient's associated pathologies, the Van Ness surgery allowed her to develop within normal parameters, being able to perform daily walks, get up from a chair, kneel, go up and down stairs, personal hygiene functions and light tasks around the house. Heavy tasks such as moving furniture or

large appliances are not possible, with difficulty walking down steep hills. She is currently off pain medication. Her difficulty in socializing continues to be a challenge; she is still "embarrassed", although with the surgery she and her mother report that contact and socialization with other children has increased, slowly but with an excellent and sustained evolution.

Currently the patient is back to her life with almost full integration of her daily activities.

Discussion

Considering the context of the 12-year-old patient, diagnosed with osteosarcoma of the distal femur stage IIB (MusculoSkeletal Tumor Society), with an aggressive nature, pathological fracture as a complication, without distant metastasis, multiple comorbidities, with indication for tumor resection from a supracondylar amputation for her subsequent social, cultural and school reintegration, we can conclude that Van Ness rotationplasty surgery (Fig. 7) is an excellent surgical option in patients with malignant tumors involving the knee, both bone and soft tissue components without distant involvement. Thus, it is possible to go from a supracondylar amputation treatment to a biological infrapatellar amputation, by performing the in block resection of the tumor and rotating the leg and foot by 180 degrees, also avoiding with this technique the prosthetic replacement according to the choice of another surgical technique, inevitable with the passing of time.

When performing this technique the ankle will act in place of the knee (given the 180° rotation), a natural, functional knee is created, and the toes send an important sensory response to the brain, (1), a characteristic of this technique of invaluable character for the patient in his temporo-spatial perception.

In our case it is important to consider and emphasize that age plays an important role both for the surgical indication and for the subsequent psychophysical adaptation of the patient, given that the younger the patient is, the greater the adaptability and flexibility in his/her rehabilitation. A length as symmetrical as possible post-surgery with the contralateral limb, evaluating the contralateral growth of the healthy limb in later years depending on its remaining growth plates, as well as the rotation in the operated limb is of utmost importance in the surgical technique, for its subsequent physio-kinesiological rehabilitation (Figure 8 and 9). In our surgery, VA-LCP distal femur plate was preferred in order to have screws with different direction vectors to the femoral neck,

avoiding as much as possible to compromise the growth plate and also to give a good compression to the osteotomy with better control in the rotations. The making and adaptability of the orthosis has been a challenge, to this day it continues to adapt to the patient, although with a very good evolution in the face of the reconfigurations. With the continuous support of the family, psychology, psychiatry and social work services, the patient's daily life was more than optimal, although she did not have great participation in the school environment at the beginning, but nowadays she has a growing integration and self-confidence.

Conclusions

Many of these patients with this type of diagnosis are usually young and have a very unfavorable prognosis with great impact on their quality of life, in view of their treatment. This surgical technique is challenging but at the same time resolute and functional above all, with a low incidence of complications and duration over time, in a relatively complex psychosocial context.

I invite publications on the post-surgical evolution of patients who have undergone this surgical technique in developing countries, so that we can mutually educate each other.

Conflict of Interest:

None

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