بسم الله الرحمن الرحيم

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A Comparative Study between Femoral Nerve Block and Saphenous Nerve Block in Enhanced Recovery after Knee Replacement Surgery under Spinal Anesthesia

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Aya Mahmoud El-Ghandour

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List of Abbreviations

Abb.	Full term
AAG	*α-acid glycoprotein*
ACB	*Adductor canal block*
ACL	*Anterior cruciate ligament*
ASA	*American society of anesthesiologists*
CPN	*Common peroneal nerve*
ERAS	*Enhanced recovery after surgery*
FA	*Femoral artery*
FN	*Femoral nerve*
FN	*Femoral nerve*
FNB	*Femoral nerve block*
FT	*Femoral triangle*
FV	*Femoral vein*
GABA-A	*Gamma aminobutyric acid*
IPACK	*Infiltration between popliteal artery & capsule of the knee*
LA	*Local anesthetic*
LAI	*Local anesthetic infiltration*
LOS	*Length of stay*
MVIC	*Maximum voluntary isometric contraction*
NRS	*Numerical rating scale*
ON	*Obturator nerve*
PABA	*Para-amino benzoic acid*
PACU	*Post anesthesia care unit*
POD	*Postoperative day*

List of Abbreviations cont...

Abb.	Full term
RA	*Regional analgesia*
RFA	*Radiofrequency*
ROSC	*Return of spontaneous circulation*
SaN	*Saphenous nerve*
SN	*Sciatic nerve*
SNB	*Sciatic nerve block*
TKA	*Total knee arthroplasty*
TKR	*Total knee replacement*
TN	*Tibial nerve*
TUG	*Time Up & Go*
US	*Ultrasound*
VAS	*Visual analogue score*
VASC	*Voltage activated Na+ channel*

Abstract

Total knee arthroplasty (TKA) is one of the most commonly performed operations in our daily practice. It is indicated in all patients with severe osteoarthritis and it needs early postoperative ambulation to improve postoperative outcomes and to reduce immobility related complications. Providing adequate analgesic control is very important to achieve functional recovery, facilitates rehabilitation and attenuates the progression from acute to chronic postsurgical pain, aiming to maximize non-opioid analgesics in addition to regional analgesic techniques. It is estimated that the majority of patients experience either severe pain (60% of patients) or moderate pain (30% of patients) following TKA surgeries. With the emergence of enhanced recovery after surgery ERAS clinical pathways, many surgical specialties are adopting multimodal analgesic regimens to improve patient outcomes.

Systemic analgesics (opioids and non-opioids) have long been used for postoperative pain, then neuraxial or peripheral nerve blocks were employed. An ideal nerve block that targets the sensory nerves and spares the motor function, can facilitate early ambulation and rehabilitation, which is a major goal for patients undergoing total knee replacement

Femoral nerve block is known to provide superior pain control and shortens the time of functional recovery and the length of hospital stay without associated side effects, in comparison with epidural or intravenous patient-controlled analgesia. However, it reduces quadriceps muscle strength and results in an increased risk of falls. Saphenous nerve block in the adductor canal finds the balance between optimal analgesia and minimal motor weakness and it continues to be an active area of research. it produces a primarily sensory block.

Keywords: Femoral Nerve Block, Saphenous Nerve Block Knee Replacement, Spinal Anesthesia

INTRODUCTION

Total knee replacement (TKR) is a very common orthopedic procedure in our daily practice. It provides a definitive treatment for patients with degenerative disease of the knee joint (Osteoarthritis) and can relieve joint pain, improve mobilization, and improve quality of life. This procedure is associated with severe agonizing early postoperative pain which results in immobilization and immobility related complications thus, an effective analgesia is mandatory. Patients are usually elderly with multiple comorbidities and it is important to choose an analgesic regimen that will minimize side effects as well as providing suitable postoperative pain relief ***(Fischer et al., 2008).***

Variety of regional nerve blocks provide an effective postoperative analgesia after total knee replacement such as lumbar plexus block, femoral nerve block FNB and adductor canal block ACB (Saphenous nerve block) ***(Jenstrup et al., 2012).***

However, femoral nerve block reduces quadriceps muscle power by about 80% which leads to delayed mobilization. This adverse effect of FNB is unaccepted especially following this type of surgery after which an early mobilization is very important for early functional recovery of the joint and to reduce immobility related complications ***(Charous et al., 2011).***

Adductor canal (Hunter's canal) contains a group of nerves and nerve branches including the saphenous nerve, the nerve to

vastus medialis, posterior branch of the obturator nerve and medial cutaneous nerve (in some cases). All these nerves are pure sensory nerves (except the nerve to vastus medialis) and play a major role in sensory supply of the knee region. Adductor canal block (Saphenous nerve block) will provide an effective postoperative analgesia after TKR and less motor impairment ***(Lund et al., 2011).***

In this study, saphenous nerve block is compared to femoral nerve block as regard ambulation ability and postoperative analgesia following total knee replacement. Quadriceps muscle power will be assessed and graded. Postoperative ambulation ability will be assessed by Timed UP-and- GO test 'TUG test'. Postoperative analgesia will be assessed by Numerical Rating Scale (NRS) and opioid consumption.

AIM OF THE WORK

This study aimed at shedding lights on the value of preserving the motor function in the immediate postoperative period after total knee replacement. That was illustrated by comparing femoral nerve block (mixed motor and sensory nerve) versus saphenous nerve block (pure sensory nerve) in the adductor canal, and the effect of either blocks on the ambulation and analgesia of the patients postoperatively.