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Research Article

Comparative Retrospective Research Examining the Effects of Anesthetic Type on Post-Hip Bipolar Hemiarthroplasty Mortality and Morbidity Case Study

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Abstract

Background: *In the literature there are few studies that compare the effect of the type of anesthesia on mortality and morbidity after hip surgery. For hip fracture operations, besides the general anesthesia (GA) and neuro-axial block (NB) techniques, recently, the combined lumbar plexus and sciatic nerve block (CLSB) technique is recommended, especially for high-risk patients.*

The purpose of this study is to establish a relationship between the type of anesthesia and mortality and morbidity of hip fracture surgery.

Our hypothesis is that CLSB technique will decrease mortality and morbidity related to pulmonary and cardiovascular complications, thus reducing in-hospital stay of the patient and hospitalization cost.

Methods: *we retrospectively reviewed the charts of 375 patients, who underwent hip hemiarthroplasty from year 2000 till year 2014, 213 patients underwent the surgery under CLSB anesthesia, 114 patients under general anesthesia, and 48 patients under neuro-axial block. Patients or their relatives were contacted for data collection about postoperative quality of life changes.*

Results: *one and five years survival rate was higher and possibility of perioperative complications was less after total hip hemiarthroplasty using CLSB anesthesia, time from trauma to operation was also a predictor for higher mortality. Patients who underwent operations under CLSB technique had better functional outcome at 3 month follow up.*

Conclusions: *To decrease the mortality rate after hip fracture and improve functional outcomes, since age and ASA status are patient-dependent factors that cannot be changed, patients must be operated on as soon as possible. Because CLSB is an encouraging technique to operate patients earlier, we recommend CLSB technique in hip fracture patients, especially for patients with poor general health status.*

1. Introduction

Hip fractures are common injuries and almost always happen at old age and are caused by low velocity trauma, with the incidence of fracture rising dramatically after the age of 70 years. Patients with hip fractures are usually old, frequently troubled by multiple co-morbidities with more than 30% aged > 85 years [1]; economically these fractures constitute a large burden on healthcare [2].

Geriatric population with its multiple co-morbid conditions is at risk of developing anesthesia-related complications. Data on the impact of type of anesthesia on postoperative morbidity and mortality is limited. The effect of regional and general anesthesia on postoperative outcome needs to be clearly elucidated [4].

In the literature there are few studies that compare the effect of the type of anesthesia on mortality and morbidity after hip surgery with long term follow up especially after bipolar hemiarthroplasty.

For hip fracture operations, besides the general anesthesia (GA) and neuro-axial block (NB) techniques, recently, the combined lumbar plexus and sciatic nerve block (CLSB) technique is recommended, especially for high-risk patients [6–10].

When compared with GA and NB, the advantages of CLSB are minimal hemodynamic disturbance and so less affected cardio vascular stability [6–11].

NB is known to reduce mortality when compared with GA [5, 12, &13]; however, survival studies in hip fracture patients have not analyzed the effect of CLSB on mortality.

Previous observational studies have resulted in conflicting data regarding the association between anesthesia type and mortality after hip fracture surgery, no conclusion about the relationship between the anesthesia type choice and mortality [14].

In a recently published research about mortality after hip fracture [15], there was an uncertain relationship between mortality and anesthesia type.

Clinical trials comparing outcomes of regional versus general anesthesia for hip fracture offer insufficient insights to guide current practice because of exclusion of key patient groups, including those with delirium or dementia, [16, 17] and those undergoing hemiarthroplasty or total hip arthroplasty [18].

The purpose of this study is to establish a relationship between the type of anesthesia and mortality and morbidity of hip fracture surgery.

Our hypothesis is that CLSB technique will decrease mortality and morbidity related to pulmonary and cardiovascular complications, thus reducing in-hospital stay of the patient and hospitalization cost.

2– Materials and Methods:

After obtaining the approval of the Research and Ethics Committee at multi centre study, a retrospective review of patients' scanned medical records with detailed collection of data from charts of all the patients who underwent arthroplasty at our institution from 1st January 2000 till 31st January 2014 was done, 1034 charts were reviewed, 372 patient with elective hip surgery were excluded, 662 charts with the diagnosis of hip fracture were further studied, patients who underwent total hip replacement, patients with the diagnosis of Polytrauma on admission, patients with unknown type of anesthesia, and those who were lost in follow up were excluded from the study. Three hundred seventy-five (375) patients with history of traumatic hip fracture who underwent hip bipolar hermiarthroplasty were included.

The patients were divided into 3 groups according to anesthesia type as general anesthesia group (GA), neuro-axial block group (NB), and combined lumbar plexus and sciatic nerve block group (CLSB).

Anesthesia types were evaluated by anesthesia flow sheet.

Intraoperative period was divided into 4 time points:

1. Base line – which is the time of induction of anesthesia.
2. Incision time.
3. Prosthesing – which is the time of insertion of the prosthesis.
4. End time.

Data about intra-op vital signs monitoring i.e. blood pressure, heart rate, and pulse oxymeter; and medications given intra-op were collected according to these times.

We created indicator variables for the medications, which quantity was not recorded in the anesthesia flow sheet, as one if the medication was given and zero if it was not used; these medications were - Sevoflurane, N2O, and Levofed.

Gender, operated limb, age at admission, trauma date, drains, delay of operation, and duration of hospital stay were obtained from patients' computerized scanned files of hospital charts, and folders.

Information about changes in mental status, post-op admission to critical care unit, in-hospital post-operative complications, blood transfusions, hemodynamic status was collected from patients' daily progress notes.

All the patients were prescribed low-molecular-weight heparin for anticoagulation from admission to hospital to postoperative day 30, patients with impaired renal function received adjusted dose of anticoagulant.

Living patients or one of the relatives of the dead patients were interviewed by phone, changes in quality of life after surgery regarding activity status, estimated visual analogue pain score, the ability to self-service, limping, as well as the date of death for the passed-away patients were recorded.

The preoperative status of the patients was classified according to the American Society of Anesthesiologists (ASA) physical scale status to predict operative risk.

2.1Types of Anesthesia:

(1) GA: endotracheal anesthesia achieved by intravenous drugs (propofol and fentanyl), neuromuscular blockers (Cisatracurium besilate – Nimbex), and inhalation agents (Sevoflurane and N2O) to render the patient unconscious.

(2) NB – injection of local anesthetic agent bupivacaine 0.5% isobaric 2.5-3 mg/kg into the subarachnoid space was used.

(3) CLSB: posterior lumbar plexus block at paramedian levels for L2-L4 and posterior sciatic block done with 60 – 70 ml of the following mixture: (preparation per 20 ml):

(a) 5ml Xylocaine 2%.

(b) 4ml (1% Xylocaine +1/200.000 Adrenalin).

(c) 1cc Fentanyl l50 microgram.

(d) 10ml Bupivacaine isobaric 0.5%.

(e) ± Catapres 15 microgram.

2.2 Statistical Analysis.

The SPSS version 19.0 was used for data analysis, Chi – square and one way Anova were used to calculate frequencies (percent) and mean (standard deviation), the cumulative survival rates were obtained as Kaplan-

Meier estimates, and the Breslow test was used to find P – value. To determine the association between potential predictors and mortality, Cox proportional hazards regression with multivariate analysis was used. P- value <0.05 was defined to be significant in all tests.

3– Results:

Three hundred seventy five patients met the inclusion criteria and were included in the study. There were three groups of patients according to anesthesia techniques: 114 patients with GA, 48 patients with NB, and 213 patients with CLSB. The baseline characteristics of the study population according to anesthesia techniques are summarized in **Table 1**.

Table1: Characteristics of the study population according to anesthesia type.

	CLSB (n= 213)	NB (n= 48)	GA (n= 114)	P-value
Age	78(8.96)	77.04(7.85)	70.75(13.51)	<0.0001
Gender				
Male	77(36.2%)	21(43.8%)	41(36%)	
Female	136(63.8%)	27(56.3%)	73(64%)	0.590
Operated limb				
Right hip	68(31.9%)	23(47.9%)	43(37.7%)	
Left hip	145(68.1%)	25(52.1%)	71(62.3%)	0.098
Alzheimer	26(12.2%)	8(17%)	11(9.9%)	0.456
Delay to operate	4.01(9.46)	3.75(5.84)	2.87(4.76)	0.455

Data are presented as Mean (standard deviation) or number of patients (%).

3.1 Demography:

There were no significant differences between the three groups regarding sex (P=0.590), operated side (P=0.098), preoperative mental status (P=0.456), and delay to operate (P=0.455). The patients' mean age was 70.75 ±13.5 for GA, 77 ± 8 for NB, and 78 ± 9 for CLSB. Patients in GA group were significantly younger than in the other two groups. **(Table1).**

The ASA status among three groups was significantly different (P<0.0001). To compare the groups' ASA status with each other, Mann-Whitney test was used. There was no significant difference in the ASA status between CLSB-NB (P=0.1), however, the ASA status was significantly different between CLSB and GA (P<0.0001) and GA and NB (P=0.032), CLSB patients' health status was worse than the other groups. The ASA status of patients according to groups is shown thoroughly in **Table 2**.

ASA score	CLSB (n= 213)	NB (n=48)	GA (n=114)	P-value
1	0(0%)	0(0%)	4(3.5%)	
2	13(6.1%)	6(12.5%)	36(31.6%)	
3	162(76.1%)	30(62.5%)	51(44.7%)	
4	38(17.8%)	12(25%)	23(20.2%)	P<0.0001*
Comparison of ASA - GA-NB				P=0.030
Comparison of ASA - GA-CLSB				P<0.0001
Comparison of ASA - NB-CLSB				P=0.121

Table2: ASA status of patients.

* P<0.05: CLSB patients' ASA score is significantly worse than NB than GA patients.

3.2 Intraoperative data:

Regarding intra-operative data of monitored vital signs and hemodynamic stability and intra-operative complications, there was no significant difference between the groups regarding operative time (P=0.638), estimated blood loss (P=0.312), respiratory complications (P=0.679), heart rate at base (P=0.573) and prosthesing (P=0.381); pulse oximetry at the base (P=0.183) and mean arterial blood pressure at base (P=0.707) and incision time (P=0.392). **(Table3).**

Heart rate was significantly more stable during the incision time (P=0.034) and at the end of operations (P=0.014) in the CLSB group. **(Table3).**

The mean arterial blood pressure (MAP) was significantly more stable in the CLSB group during prosthesing and at the end of operation with P<0.0001 and P=0.045 respectively. **(Table3).**

There was significant difference in the necessity to keep hemovac in the operative wound and the use of Foley catheter with (P<0.002), the highest percentage of using hemovac was for patients in the GA group, while highest percentage of patients for whom Foley was inserted and for whom hemovac and Foley were used was in the NB group. **(Table3).**

Overall most of the patients were treated using cemented prosthesis P<0.0001, so was the majority of patients in the NB group 84%, compared to GA 51%, and CLSB 66%. **(Table3).**

Table3: Intra-operative data and complications

	CLSB (n= 213)	**NB (n= 48)**	**GA (n= 114)**	**P-value**
Operative time(min)	175.28(49.59)	169.58(51.48)	170.70(50.67)	0.638
Drain				
None	59(27.7%)	6(12.5%)	18(15.8%)	
Foley	4(1.9%)	3(6.3%)	0(0%)	
Hemovac	137(64.3%)	32(66.7%)	90(78.9%)	
Hemovac and Foley	13(6.1%)	7(14.6%)	6(5.3%)	0.002
Heart rate/min				
Base	82.23(10.17)	83.69(12.48)	83.33(12.25)	0.573
Incision	77.29(13.64)	80(10.86)	74.56(11.77)	0.034
Prosthesing	72.81(12.41)	75.88(16)	73.15(15.36)	0.381
End	75.74(11.73)	81.15(10.68)	78.2(14.16)	0.014
Pulse oximetry				
Base	99.29(2.67)	98.92(2.63)	99.61(0.98)	0.183
Incision	99.43(1.56)	98.75(2.39)	99.4(1.71)	0.044
Prosthesing	99.51(1.37)	98.77(2.34)	99.37(1.32)	0.011
End	99.56(1.39)	99(1.95)	99.44(0.99)	0.041
Mean arterial pressure(MAP)				
Base	95.9(12.53)	94.4(11.35)	95.28(10.84)	0.707
Incision	83.36(15.68)	81.45(14.46)	84.88(13.63)	0.392
Prosthesing	74.93(11.60)	79.71(11.06)	82.13(15.18)	<0.0001
End	86.66(12.41)	86.39(7.92)	89.73(9.61)	0.045
Periprosthetic fracture	0(0%)	1(2.1%)	0(0%)	0.033
Kept on BYPAP	1(0.5%)	0 (0%)	0(0%)	0.679

Data are presented as Mean (standard deviation) or number of patients (%).

3.3 Postoperative course in hospital:

Course of the patients postoperatively while in hospital is shown in **Table 4**. It includes data about admission to intensive care unit (ICU) or cardiac care unit (CCU) and its outcome, where there was no significance in the rate of admission to ICU/CCU between the groups (P=0.100), but the outcome of ICU/CCU was significantly different, most of the patients in the CLSB and NB groups recovered and were discharged from hospital, while all the patients of the GA group passed away while in the ICU/CCU.

No significant differences in some Post-operative complications were noted among the three groups such as supraventricular tachycardia (SVT) (P=0.215), unconsciousness (P=0.380), dyspnea (P=0.329), seizures (P=0.269), acidosis (P=0.215), hypoxia (P=0.225), pulmonary embolism (P=0.125), deep venous thrombosis (P=0.990), hallucination (P=0.615), wound infection (P=0.403), readmission within one month, and upper GI bleed (P=0.431). **(Table4).**

Patients with GA had more STEMI (P=0.031), pneumonia and atelectasis (P<0.0001), desaturation (P=0.014), constipation (P=0.021), confusion (P<0.0001), nausea, and vomiting (P<0.0001); while patients with NB had more urine retention (P=0.026), and agitation (P<0.0001). All the complications were less in the CLSB group. **(Table4).**

There was also significant difference in consumption of non-opioid analgesics postoperatively; patients with GA and NB used much more Paracetamol and Profenid than patients in the CLSB group (P<0.0001), while on the other hand, there was no difference in consumption of narcotics and opioids between the groups. **(Table4).**

Table4: Early post-operative data and complications (while patients still in hospital)

	CLSB (n= 213)	**NB (n= 48)**	**GA (n= 114)**	**P-value**
Admission to ICU/CCU	31(14.6%)	7(14.6%)	11(9.6%)	0.431
Outcome of ICU/CCU				
Recovered	27(90%)	6(85.7%)	0(0%)	
Seizure, unconscious	2(6.7%)	0(0%)	0(0%)	
Passed away	1(3.3%)	1(14.3%)	11(100%)	<0.0001
STEMI	0(0%)	0(0%)	3(2.6%)	0.031

SVT	4(1.9%)	0(0%)	0(0%)	0.215
Unconsciousness	3(1.4%)	1(2.1%)	0(0%)	0.380
Pneumonia and Atelectasis	43(20.2%)	5(10.4%)	43(37.7%)	<0.0001
Dyspnea	4(1.9%)	1(2.1%)	0(0%)	0.329
Seizure	8(3.6%)	2(4.2%)	2(1.8%)	0.269
Desaturation	7(3.3%)	4(8.3%)	13(11.4%)	0.014
Acidosis	4(1.9%)	0(0%)	0(0%)	0.215
Hypoxia	6(2.1%)	0(0%)	0(0%)	0.225
Urine retention	0(0%)	2(4.2%)	3(2.6%)	0.026
Constipation	0(0%)	2(4.2%)	3(2.6%)	0.021
Upper GI bleed	0(0%)	0(0%)	2(1.8%)	0.100
PE	7(3.3%)	2(4.2%)	0(0%)	0.125
DVT	4(1.9%)	1(2.1%)	2(1.8%)	0.990
Wound infection	10(4.7%)	2(4.2%)	2(1.8%)	0.403
Alteration in mental status				
Hallucination	4(1.9%)	2(4.3%)	3(2.7%)	0.615
Agitation	0(0%)	6(12.8%)	13(11.7%)	<0.0001
Disorientation	47(22.1%)	6(12.8%)	28(25.2%)	0.221
Confusion	9(4.2%)	6(12.8%)	26(23.4%)	<0.0001
Nausea	108(51.6%)	25(53.3%)	76(72.4%)	<0.0001
Vomiting	112(52.6%)	28(58.3%)	86(75.4%)	<0.0001
Mean dosage of Paracetamol	2.69(2.54)	5.85(4.76)	7.23(8.43)	<0.0001
Mean dosage of Dolosal	129.4(203.62)	176.8(234.75)	145.8(184.01)	0.322
Mean dosage of Tramal	1104(8682.9)	435.63(542.2)	214.04(266.9)	0.474
Mean dosage of Profenid	72.54(164.5)	91.67(260.79)	7.89(27.08)	<0.0001

Data are presented as Mean (standard deviation) or number of patients (%).

3.4 Patients' progression at home:

Table 5 shows late post-operative data of patients' progression at home, there was no difference in pain while moving where, mean visual analogue pain score was 1.54, 2.08, and 1.85 in the CLSB, NB, and GA groups respectively. There was no statistical difference in the percentage of patients who were able to walk at home, and those who used cane or crutches as ambulating aid, in the three groups.

The groups were comparable according to patients' activities at home without any significant difference, although patients in CLSB performed better in means of putting shoes, and wearing socks 53.5% compared to 50% and 42.1% in the NB and GA groups respectively. **(Table5).**

Limping (P=0.081), dislocation rate (P=0.199), readmission within one month (P=0.262), and duration of hospital stay (P=0.158) were similar between groups. **(Table5).**

Pain at rest was least in the CLSB group, with mean visual analogue pain score of 0.77 compared to 1.23 in the other 2 groups. **(Table5).**

More patients in the GA group were bed ridden (P=0.032), where more patients from the CLSB group were able to climb stairs (P<0.0001), walk outdoor (P<0.0001), and use transport (P<0.001). **(Table5).**

Patients with CLSB could tolerate more time sitting in the chair in comparison with the other groups with P<0.0001. **(Table5).**

Table5: Late post-operative data of patients' progression at home

	Block (n= 213)	**Spinal (n= 48)**	**General (n= 114)**	**P-value**
Pain				
At rest	0.77(1.14)	1.23(1.51)	1.23(1.98)	0.028
While moving	1.54(1.93)	2.08(2.27)	1.85(2.49)	0.193
Walking ability				
Bed ridden	51(23.9%)	14(29.2%)	43(37.7%)	0.032
Within home	155(72.8%)	34(70.8%)	67(58.8%)	0.061
Climbing stairs	111(52.1%)	24(50%)	31(27.2%)	<0.0001
Walking outdoor	89(41.8%)	19(39.6%)	22(19.3%)	<0.0001
Using transport	80(37.6%)	16(33.3%)	20(17.5%)	0.001
Walking support				
Cane	49(23%)	11(22.9%)	20(17.5%)	0.496
Crutches	0(0%)	0(0%)	2(1.8%)	0.100

Walker	49(23%)	9(18.8%)	38(33.3%)	0.063
None	115(54%)	28(58.3%)	54(47.4%)	
Activities				
None	70(32.9%)	16(33.3%)	48(42.1%)	0.235
Putting shoes	114(53.5%)	24(50%)	48(42.1%)	0.144
Wearing socks	114(53.5%)	24(50%)	48(42.1%)	0.144
Self-service toilet usage	139(65.3%)	32(66.7%)	60(52.6%)	0.061
Limp	55(25.8%)	7(14.6%)	19(16.7%)	0.081
Chair sitting duration tolerability				
None	36(16.9%)	12(25%)	36(31.6%)	
30 minutes	50(23.5%)	10(20.8%)	39(34.2%)	
Hours	127(59.6%)	26(54.2%)	39(34.2%)	<0.0001
Dislocation	6(2.8%)	1(2.1%)	0(0%)	0.199
Hospital stay	10.13(6.80)	8.52(3.63)	8.94(7.36)	0.158
Readmission within one month	5(2.3%)	1(2.1%)	0(0%)	0.262
Alive	133(62.4%)	21(43.8%)	48(42.1%)	0.001
Time from operation to death (years)	5.59(3.05)	3.67(3.25)	4.21(3.82)	0.011

Data are presented as Mean (standard deviation) or number of patients (%).

3.5 Mortality:

The one-year mortality rates of GA patients, NB patients, and CLSB patients were 41.7%, 35%, and 28.3%, respectively (P=0.034). One-year mortality rate was significantly lower in CLSB group than GA and NB groups. The overall mortality rates of GA patients, NB patients, and CLSB patients were 69.6%, 56%, and 33.7%, respectively (P<0.001). Overall mortality rate was significantly lower for CLSB than GA and NB groups. **(Table6).**

To determine the association between potential predictors of mortality (age, ASA status, delay to operate, operative time), Cox regression analysis was used. In the first Cox regression analysis GA was categorized as reference group, and NB and CLSB anesthesia types, were taken as variables in regards to the reference – CLSB group. Age (P<0.0001), delay to operate (P=0.056), operative time (P=0.008) and ASA (P=0.033) were found significant predictors of mortality. Both NB and CLSB choices combined were found to decrease mortality in this multivariate analysis (P=0.039). Since the anesthesia types were nominal variables in three different categories, we performed two more Cox regression analyses in order to find out the distinction between NB and CLSB choices. In the second Cox regression analysis, NB was not correlated with decreased mortality (P=0.65), when GA group was assigned as reference with regard to NB variable. However, in the third Cox regression analysis, GA and NB groups were collectively assigned as reference in regards to CLSB variable. CLSB was shown to decrease mortality significantly (P<0.020, odds ratio = 0.471, confidence interval 0.250-0.889). Cox regression analyses are shown in **Table7**.

Estimated median survival time for CLSB patients was 6 years while, it was equal to 2 years for both NB and GA patients with 95% confidence interval of 4.93-7.06 for CLSB, 1.37-2.62 for NB, and 1.00-2.99 for GA. Estimated median survival time was significantly higher for CLSB than GA group and NB (P<0.001) Mortality rates are summarized in **Table8**, and survival curves are shown in **Figure 1**.

Table6 mortality rates between groups.

	CLSB (n=213)	**NB(n=48)**	**GA(n=114)**	**P value**
One year mortality	28.3%	35%	41.7%	0.034
Overall mortality	33.7%	56%	69.6%	<0.001

Table7: Summary of Cox regression analyses.

	P value	**Odds ratio**	**95% confidence interval**
Age	<0.0001	0.94	0.91-0.972
ASA score	0.033*	0.93	0.90-0.963
Delay to operate	0.056*	0.925	0.855-1.002
Operative time	0.008*	1.010	1.003-1.017
GA versus CLSB+NB (Cox 1)	0.039*	0.627**	0.235-0.987
GA versus NB (Cox 2)	0.65	1.021	1.042-1.055
GA+NB versus CLSB (Cox3)	0.02*	0.471**	0.250-0.889

Table8: Estimated Survival analysis.

	Estimated survival (years)	95% Confidence Interval	P-value*
CLSB	6	4.93-7.06	
NB	2	1.37-2.62	
GA	2	1.00-2.99	0.001

*Breslow

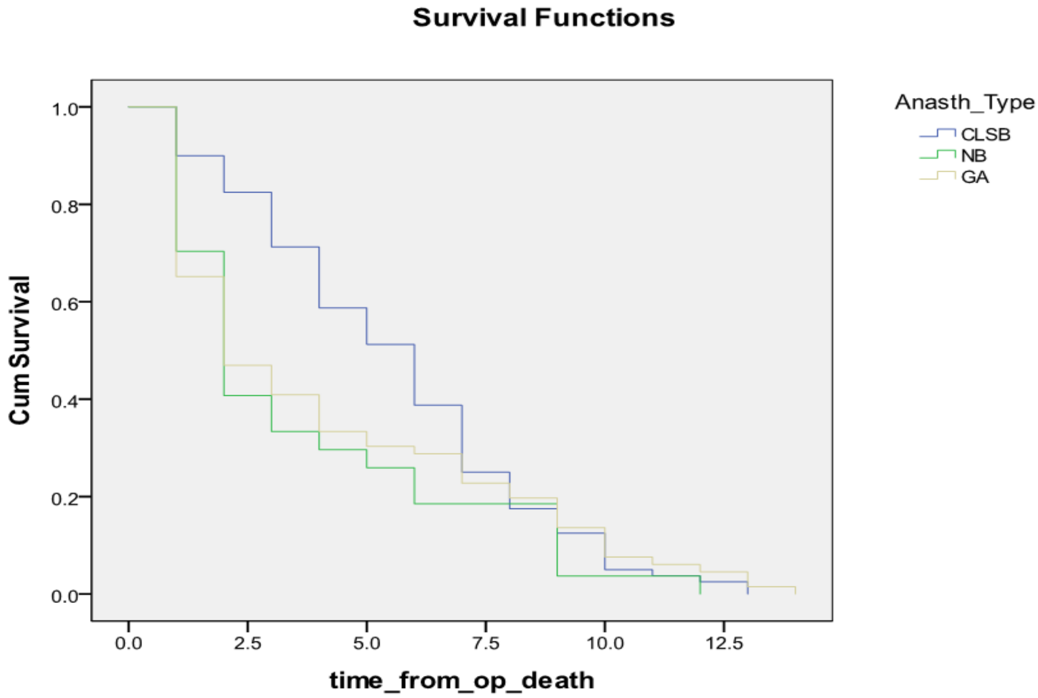

Figure1. The graph shows Kaplan-Meier survival curves for general anesthesia (GA), neuro-axial block (NB), and combined lumbar and sciatic block (CLSB) patients.

4– Discussion :

We retrospectively reviewed 375 patients with sub-capital hip fracture treated with bipolar hip hemiarthroplasty, operations were done under three types of anesthesia, the GA, NB, and the CLSB types, we tried to figure out the effect of the type of anesthesia on the mortality and morbidity and factors affecting patients' progression postop in hospital and later on at home.

ASA physical scale status is commonly used to classify the preoperative status of the hip fracture patients [24-26]. Hamlet et al. [24] reported that 3-year mortality was significantly less for ASA I and II patients (23%) than for ASA III, IV, and V patients (39%). Michel et al. [25] reported that in 114 patients treated for hip fracture, high ASA status (III or IV) conferred a nine times increased risk for mortality at one year. However, in the review for anesthetic risk factors, Haljamäe [27] stated that because ASA classification considers only physical status factors, other risk-predictive factors such as age, gender, site of trauma, delay in surgical treatment, length of surgery, and the type of fracture pattern should also be included for individual cases; so we included patients who underwent only bipolar hemiarthroplasty after traumatic event so that we could unify the type and site of surgery and found that, age, delay to operate and length of surgery were also significant predictors of mortality.

These factors (age, delay in operation, and length of surgery) held a higher impact on survival when GA was used for patients with ASA III and IV. Our study also showed that patients who underwent the surgery under GA and who needed ICU or CCU later on in the hospital stay all passed away, this emphasizes more on the need to use other type of anesthesia in the critically ill patients of older age.

When the three groups of patients were compared, there were no significant differences in gender, operated side, mental status, and delay to operate. Similar to other studies [28, 29, and 30], delay to operate is associated with increased mortality in our study (P=0,028) (Table6).

Despite that the mean age of the GA patients was significantly younger than NB and CLSB patients, which would have decreased the mortality of GA patients as in other studies, [31-35], also, the ASA status of CLSB patients was significantly worse than GA and NB patients, that would have also increased the mortality of CSLB patients according to some studies [24-26], in our study the overall mortality rate was significantly less in the CLSB group, furthermore, the one year survival rate was better in the CLSB group so was the five year survival rate.

Sidi [36] showed that during the induction phase of GA Coronary vasospasm occurs, which leads to higher incidence of STEMI in patients at risk, our study also showed the same result with a significant P=0.031 value, thus it is advisable to sort patients according to ASA score and to avoid using GA to patients at high cardiac risk.

Atelectasis during GA is common, but usually does not cause clinically significant problems. Persistent prolonged atelectasis after GA increases perioperative respiratory complications. The use of N2O during GA renders patients to higher risk of developing atelectasis and subsequently pneumonia especially in obese patients with preexisting pulmonary comorbidities as shown by A. Hole [37]; our study showed that the use CLSB decreased the risk of developing these complications.

Papaioannou et. al [38] concluded that elderly patients subjected to GA display more frequent cognitive impairment during the immediate postoperative period in comparison to those who received a regional technique (NB or CLSB), the incidence of delirium was higher in patients with preexisting cardiovascular disease. In our study patients with GA had higher incidence of confusion in the early postoperative period. Patients with GA having higher probability of intra-operative atelectasis with preexisting cardiovascular disease should be anticipated to have some kind of decreased oxygen delivery to the brain which will affect their cognitive function and will be reflected as confusion as is the case in our study, especially if the patient receives a higher than needed dose of anesthetic agent during operation due to mismatch between estimated patient's weight and real weight.

The use of volatile anesthetics is associated with a two-fold increase in the risk of post-operative nausea and vomiting (PONV), with risk increases in a dose-dependent manner, and no significant difference in incidence with different volatile anesthetics. In fact, the use of volatile anesthetics is the single most important factor for predicting emesis in the first 2 post-operative hours. [39] Nitrous oxide increases the relative risk of PONV by 1.4 times, opioid use increases the risk of PONV in a dose-dependent manner. Patients in our study who received GA had 2 fold incidence of having PONV while this risk was less with the other groups, the duration of operation and postop opioid consumption was statistically the same between groups which eliminates the effect of these variables on PONV and keeps the significant impact of the type of anesthesia.

In their study about Risk factors for urinary retention after hip or knee replacement, [40] Griesdale D., et al. concluded that Postoperative urinary retention is a common complication after total hip or total knee replacement, especially amongst men and patients receiving intrathecal morphine for anesthesia i.e. NB. Although we didn't use morphine as anesthetic agent in our study, we also had increased risk of urinary retention after NB compared with GA and CLSB. Spinal agents influence the function of the lower urinary tract, by direct spinal action on the sacral nociceptive neurons and autonomic fibers, as well as by an effect on supraspinal centers. Urinary retention is less common after a short-acting (Lidocaine 5%) than after a long-acting agent (bupivacaine 0.5%) which we used for our patients for NB anesthesia and was found to decrease detrusor muscle strength and the ability to void. [41].

The one-year and overall mortality rates were decreased for the CLSB group. Also estimated survival time was higher for this group. In several studies, the reduction in morbidity and mortality had been shown with block anesthesia [28, 42]. In our study after eliminating patients' individual data that would have affected mortality (age, sex, ASA, operated site, length of operation, and delay to operate) we found that CLSB choice was an independent variable of decreased mortality; and it had added protective value when used as anesthesia modality to high risk patients. Using the CLSB technique added to the survival of patients after bipolar hip hemiarthroplasty at least 3 years of life with 95% confidence interval (CI) 4.93-7.06 where patients who underwent the operation under GA or NB anesthesia had 1.00-2.99 CI.

Naja et al. [10] treated 60 patients for hip fracture, 30 patients with general anesthesia, and 30 patients with combined sciatic-paravertebral nerve block. They reported that both the incidence of intraoperative hypotension and the postoperative need for intensive care unit admission was significantly reduced in patients treated with combined sciatic-paravertebral nerve block compared to patients receiving general anesthesia. Similarly, in their prospective randomized study, de Visme et al. [6] treated 29 patients for hip fracture, 15 patients received combined lumbar and sacral plexus block, and 14 patients received spinal anesthesia. They found that hypotension was to be longer lasting after spinal anesthesia and of a larger magnitude in patients over 85 years of age. CLSB, as a rising trend, is correlated with minimal hemodynamic disturbance and so less affected cardiovascular stability [6–11]. These advantages of CLSB promote us to operate high-risk (ASA III AND IV) hip fracture patients earlier without seeking medical treatment modalities for their systemic diseases.

One of the withdraws of our study was the inability to evaluate patient's BMI before operation, as all of the hip fracture patients are kept in complete bed rest regimen, formulas to estimate patient's weight do exist but they are not accurate to use them in a study, and our facility is not equipped with built in weight measuring beds to obtain the needed data to study the effect of BMI on patient's outcome and to precisely calculate the needed dose of anesthetic agents; as we think that obesity would affect patients' overall performance and postop outcome, this should be a field to study in the future.

In conclusion, to decrease the mortality rate after hip fracture, since age and ASA status are patient-dependent factors that cannot be changed, the patients must be operated on as soon as possible. Because CLSB is an encouraging technique to operate patients earlier, we recommend CLSB technique in hip fracture patients, especially for patients with poor general health status and of old age. Considering the retrospective nature of the study, and the effects of personal characteristics, it is hard for us to claim that "CLSB technique decreases mortality." Nevertheless, our hypothesis and results at least may form the basis and show the need for future randomized prospective studies.

However, the mean age of the GA patients was significantly younger than NB and CSLB patients, which would decrease the mortality of NB patients [31-35]. Also, the ASA status of CLSB patients was significantly worse than GA and NB patients that would increase the mortality of CLSB patients according to other studies [24-26].

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