BACKGROUND: Much Concern has been raised about the effects of anesthetic drugs on cognition. Postoperative cognitive dysfunction may manifest as impairment in attention, memory, language or executive functions following surgery, and can persist for weeks, months, or even with varying severity. Such post operative cognitive dysfunction can be quite mild and only diagnosed through psychometric assessment using specific neuropsychological tests. Postoperative cognitive decline occurs more frequently in the elderly population with an incidence as high as 26% in patients older than 60 years and it can persist more than one week. The factors that have been implicated in increasing the risk of postoperative cognitive dysfunction include duration of surgery, pain, old age, preoperative impairment in neurocognitive function, hypoxemia, metabolic disturbances, and use of certain anesthetics.

Multiple clinical trials have attempted to differentiate the effect of general versus regional anesthesia on cognitive function. While most of the studies showed no difference in post operative cognitive function between regional and general anesthesia, some trials showed a significant difference in post operative cognitive outcomes between both anesthetic techniques.

There is large evidence that neurotoxicity among local anesthetics varies. These works suggest that lidocaine is more toxic than equivalent concentrations of bupivacaine. However, this is still up for debate as other studies have shown that there is no difference in toxicity between local anesthetics.

AIM OF THE WORK: The aim of this study was to determine which of the two local anesthetics (lidocaine vs bupivacaine) has worse effect on cognitive function in patients undergoing elective cataract surgery.

SUBJECTS & METHODS:

Study design and population: This is a prospective randomized study carried out on 61 patients undergoing elective cataract surgery by phacoemulsification under local anesthesia in the Department of Anaesthesia, Faculty of Medicine, Beni-Suef University. The patients were recruited in the period between May 2017 and November 2017 from the Outpatient clinics of Bani-Suef University Hospital.

Inclusion criteria: 61 patients undergoing elective cataract surgery by phacoemulsification under local anesthesia. 28 patients received lidocaine 2% and 33 patients received bupivacaine 0.5%. The subjects provided signed written informed consent to participate.

Exclusion criteria: Patients with major language disturbance or auditory impairment affecting their ability to complete testing, patients with pre-existing cognitive, psychiatric or central nervous system disorders, patients with nystagmus, allergy to local anesthetics, intravenous sedation, any coexisting ocular conditions that could affect the scoring system for local anesthesia such as ptoisis, ocular movement abnormalities, reduced corneal sensation, or facial nerve palsy, inability to understand the information about the study or if the patient refused the local anesthesia technique.

Selected patients were subjected to the following:

Assessment of cognitive function: Cognitive assessment for all patients was done preoperatively and one week post operative using Paired associate learning test (PALT) and category verbal fluency test (animal category).

Anesthetic technique: Cataract surgery was performed for all patients by the same anesthesiologist using the same anesthetic technique. The included 61 patients in the study were divided into two groups; the first group included 28 patients injected with lidocaine 2% with total volume 7 ml and the 2nd group included 33 patients injected with bupivacaine 0.5% with the same volume 7 ml, hyaluronic acid 15 IU was added to the drugs before injection.

- Motor functions: Motor functions were assessed by the levator, orbicularis oculi and the extracocular muscles; up, down, medial, lateral and sensory functions (displacement of manipulanda at limbs and touch anaesthetic sting) were evaluated using Ocular Anaesthetic Scoring System (OASS). Intraoperative pain was assessed using the Visual Analogue Pain (VAP) Scale.

- Surgical technique: Cataract surgery was performed after prior conjunctival incision and cleansing with povidone iodine 5% and 10% solution, respectively. In all patients, a 2.8 mm clear corneal incision was made at the most curved axis. Phacoemulsification was performed with implantation of an acrylic intraocular lens into the capsular bag through a sutureless incision.

RESULTS:

- The mean age of patients in lidocaine group (n=28) was 51.29 ± 11.42 years, while the mean age of patients in bupivacaine group (n=33) was 55.97 ± 11.35 years. 46.4% (n=13) of the patients in lidocaine group were males and 53.6% (n=15) were females. Regarding patients in Bupivacaine group, 33.3% (n=11) were males and 66.7% (n=22) were females. There was no statistically significant difference between both groups in age (P-value = 0.11) or sex (P-value = 0.297).

- Regarding motor score of OASS, patients in lidocaine group were found to have significantly higher mean values in the total motor score than patients in bupivacaine group (P-value < 0.001), while there was no statistically significant difference between patients in lidocaine group and those in bupivacaine group in the total sensory score of OASS (P-value = 0.168) or VAP Scale score (P-value = 0.787) (Table 1).

- Regarding the total score of PALT in patients in lidocaine group, there was a statistically significant difference between the mean value of preoperative PALT and postoperative PALT (P-value = 0.004). In bupivacaine group there was a less statistically significant difference between the mean value of preoperative and postoperative PALT (P-value = 0.021). On comparing lidocaine and bupivacaine groups in PALT scores, there was no statistically significant difference between both groups (P-value = 0.579) (Table 2, Figure 1,2).

CONCLUSION:

- Both lidocaine and bupivacaine cause postoperative impairment in verbal memory, attention and executive function due to their neurotoxic side effects. Lidocaine was found to be worse than bupivacaine but the difference was not statistically significant. Lidocaine significantly affected motor function than bupivacaine in patients undergoing elective cataract surgery.

REFERENCES: