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Frequency of mortality in American society of Anesthesiologist class-I, II, III after neurosurgical procedure at lady reading hospital Peshawar

Fazal Karim¹, Ayesha Jehad¹, Bahrul Amin^{2*}, Naqash Ahmad³, Imdad Ullah⁴

^{1, 2, 3} *Department of Anesthesia, Medical Teaching Institutions, College of Medical Technology, Bacha Khan Medical College Mardan, Pakistan*

^{1, 4} *Northwest institute of health Sciences Peshawar, Pakistan*

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Abstract

The American Society of Anesthesia, ASA classification is utilized to evaluate fitness of patients prior to surgery and in 1963, it was first described and renewed. The purpose of this classification is to decrease the mortality rate related to anesthesia performing the surgical intervention to provide the safe anesthesia for the patient care. The aim of this is to find out the mortality ratio in different ASA classes except class IV in neurosurgical procedure. A cross-sectional study conducted in LRH Peshawar. Data was collected with non-probability convenient sampling technique from 178 patients including both male and female patients. Out of the total population, (62.4%) n = 111 were male and (37.6%) n = 67 were female. After observing the entire patient in different classes the ASA Class-I includes total number of patient 108(60.7%) and patient in ASA Class-II is 56 (31.5%) while ASA Class-III has 14 (7.9%). Out of these total 146 (82%) patient were discharges after surgical procedure while the 32(18%) patient were expired. The results of the research shown that total number of expire patient in ASA class-I 11 (10.2%) and in ASA class-II, 11 (19.6%) patients were expired. In ASA class-III the expiry rate was high that is 10 (71.4%) patients. So, we observed from the study that the mortality rate increases with increase of ASA grade and shows that the ASA grading is very important to evaluate the survival of the patients for safe anesthesia and surgical intervention.

*Corresponding Author: Bahrul Amin ✉ Behrulam18@gmail.com

Introduction

The American Society of Anesthesia, ASA classification system is physical grading system used for the fitness of patients before surgery. It was first designated and renewed in 1963. The aim of this grading is to predict preoperative score of risk markers in patient performing surgical procedure. The current period of grading consist of 6 basic categories ranges from ASA Class-I to ASA class-VI.(Aronson *et al.* , 2003).

There are six categories in this ASA physical status which are following.

Healthy person

A person with controlled systemic disease for example Controlled Diabetic mellitus.

A person with chronic illness which is not threatens to life. For example chronic renal failure or poorly treated HTN.

A person with a chronic disease that is threatens to the life. For example poorly controlled chronic obstructive pulmonary disease.

An individual who is not thought to survive without the surgery.

A person with confirmed brain deceased function who intend organ for donor purpose.

In case of emergency "E" is added to the above category.

On the basis of this American Society of Anesthesia physical grading score anesthetist plan the surgical procedure. The ASA Classification can applicable for all patients in order to evaluate physical condition and fitness for undergoing surgery.

In 1800 the modern period of neurosurgery starts with important intervention which include concept of general Anesthesia to provide safe surgery with psychological satisfaction. Effectiveness of surgical

intervention depends upon the intra-operative and post-operatively morbidity result in better outcome.(Abu-Elmagd *et al.*, 2012) In the neurosurgical procedure the cranial surgery is most high risk intervention but certain pre-operative test predictor score make the clinician aware about risk in order to decrease risk Peri-operatively. ASA physical grading score is used to access the patient condition but it's not authentic for pre-operative risk to evaluate patient and decided the planned surgery (Sağlam, 2019). ASA score is most valuable in many different surgical condition like abdominal surgery, vascular surgery, spinal and cranial surgery to predict the risk Peri-operatively also demonstrated us mortality in planned cardiac intervention(Fu *et al.*, 2011). Like the ASA score there is EURO Score which is used in many surgical intervention especially in cardiac surgeries to predict the risk factor Peri-operatively and other scores which is Kanosfsky Performance Score (KPS) ranges from 0-100 that are used for the neurosurgical procedures such as intracranial turner surgery(Simon *et al.*, 2009). Modified Rankin Score (MRS) is also best pre-operatively score predictor in cerebrovascular patient(Sacko, D and Grenier, 2007). Neurosurgical procedure which includes the intracranial tumors, intracranial aneurysm Charlson Co morbidity score is valid for pre-operative prediction regarding patient(Hammers *et al.*, 2010).Apart this ASA score is used to evaluate the physical state of patient required surgical procedures. ASA score in neurosurgical procedure mark the clinicians to decide and to estimate the risk factors(Ogilvy, 2003).According to the American Society of Anesthesia ratio of mortality in ASA Class-I Class-II ranges from 0.02-0.04 per 10, 000(Fasting, 2010).But there is not any exact knowledge regarding the ratio of mortality in different ASA Classes for neurosurgical procedure. The objective of research is to find out the mortality ratio in different ASA classes of neurosurgical patient.

Methodology

Study design

This was a descriptive cross sectional study conducted from September - December 2016 in Lady Reading

Hospital Peshawar, Khyber Pakhtunkhwa.

Sample size

The sample size for this study was 178 patient undergoing neurosurgical procedures.

Inclusion and exclusion

All Patient's (male and female) who were presented for neurosurgical procedures with physical Grading system including class-I, II, and III according to ASA classification. Patient with ASA Physical grading system class IV, V were excluded from the study.

Study approval

This study was conducted after approval from research undergraduate committee of KMU and Lady Reading Hospital, Peshawar.

Procedure

The patient was perceived for ASA Physical grading system undergoing Neurosurgery procedure using Non-probability convenient sampling technique.

During the time period of this cross sectional study total patient data was collected by receiving past medical history.

All patients of ASA class-I, II and III presented for neurosurgery were observed post-operatively surgery for 48-72 hours. Total patient attend the questionnaire in order to collect data related to the research topic. The Proforma was designed in context of research topic required variables.

Data analysis

The final data obtained was scrutinized using SPSS version 22 and the data after analysis was represented through tables in the result.

Results

Total one hundred and seventy eight patient data collected in LRH hospital Peshawar in order to determine the mortality ratio among ASA physical grading system including Class-I, II and III in neurosurgery patient.

Table 1. Age Distribution.

Age group	Frequency
15-24	35 (19.7%)
25-34	37 (20.8%)
35-44	31 (17.4%)
45-54	28 (15.7%)
55-64	28 (15.7%)
>65	19 (10.7%)
Total	178

Total one hundred and seventy eight patient in which 35 patient were in 15-24 years. 37 patients were in age of 25-34 years while 31 patients in age group of 35-44 years. From 45-54 years the number of the patient is 28 (15.7%). From 55-64 age groups the patient is 28(15.7%) and above 65 year total patient are 19(10.7%) (Table1).

Male were 111 (62.4%) while 67 (37.6%) patients were female (Table 2).

Patient of 108 (60.7%) were in ASA Class-I. Class-II included 56(31%) patient and Class-III having 14 (7.9%) (Table 3).

Patient of 104 (58.4%) were performed craniotomy, the 34(19.1%) undergone laminectomy, for discectomy the number of the patient is 18 (10.1%), Shunt surgeries (LP and VP) included 9(5.05%) patient. Number of patient in aneurysm procedure is 6(3.4%) and 7 (3.9%) patients in different other interventional procedures (Table 4).

All patients whose operated for different neurosurgical procedure followed postoperatively up to 72hours. Patients of 146 (82%) out of 178were discharge and rest of the 32(18%) patients were expired. This shows that number of expired patient are less as compared to the discharge patient.

Table 2. Gender distributions.

Gender	Frequency
Male	111 (62.4%)
Female	67 (37.6%)
Total	178

Out of the 178 the number of patient in Class-1 is 108(60.6%) in which 11 patient were expired while 97 patient were discharged.

ASA class-II included 56 (31.4%) patients in which 45 were discharged and 11 patients expired. While in Class-III total patient is 14 (7.86%) in which expired patient is 10 and discharge number of patient is 4. So, we detected that the mortality ratio is increasing with

higher ASA class.

Discussion

The American Society of Anesthesia, ASA classification system is physical grading score which used for the fitness of patients before surgery. It was first described and renewed in 1963. The aim of this grading Score is to predict preoperative score of risk markers in patient undergoing surgical intervention.

Table 3. ASA grading among patient.

ASA Status	Frequency
ASA Class-I	108 (60.7%)
ASA Class-II	56 (31.5%)
ASA Class-III	14 (7.9%)
Total	178

Table 4. Surgical procedures.

Surgical procedure	Frequency
Craniotomy	104 (58.4%)
Laminectomy	34 (19.1%)
Discectomy	18 (10.1%)
Lumber-Peritoneal shunt	1 (.6%)
Ventriculo-Peritoneal shunt	8 (4.5%)
Aneurysm	6 (3.4%)
Others	7 (3.9%)
Total	178

The current period of the grading consist of 6 main categories ranges from ASA Class-I to ASA class-VI. In case of emergency "E" is added to the ASA category (Ridley *et al.*, 1995).

Preoperatively assessing the patient is mandatory in order to provide the safe anesthesia and minimize the mortality ratio preoperatively. To ensure the patient safety different score are used preoperatively to monitor the patient before surgical procedure. One of

the important and reliable score is ASA classification which has different classes and patient are categorize according to the health status. According to the study which is conducted in 1954 by Beecher and Todd was first and earliest anesthetist who demonstrated the mortality rate related to anesthesia in neurosurgical patient. In 1941scientist Saklad identified the ASA best assessment preoperative risk score for the patient undergoing surgical procedure(Brodsky, 1995).

Table 5. Frequency of mortality.

Outcome	Frequency
Discharge	146 (82.0%)
Expired	32 (18.0%)
Total	178

According to our result study which shows 18% ratio of mortality post-operatively in neurosurgical procedure which almost similar to Felt Spitznagel research result (Brodsky, 1995). According to Turet *et al.*, 1988 the mortality ratio in ASA-I class of neurosurgical is 9.02% in 1000 neurosurgical patient. Our result shows the mortality rate in ASA class-I is

10.2% in 108 patients and mortality ratio is 19.6% in ASA class-II.

A study conducted in 2006 by Forrest and its colleagues showing the mortality ratio in Class-III is 18.3% and my result shows ratio in Class-III is 71.4% which is very high as compared to other Classes.

Table 6. Outcomes among ASA classification.

ASA classification	Outcome		Total
	Discharge	Expired	
Class-I	97	11	108
Class-II	45	11	56
Class-III	4	10	14
Total	146	32	178

The study conducted by Jones to in order to find out the anesthesia related mortality ratio in different ASA Class shows 12.1% in Class-I, 33.4% in Class-II and 74.2% in Class-III postoperatively neurosurgical procedure (Australian and New Zealand College of Anaesthetists, 2014) which is similar to our study that is 10.2% ASA-I, 19.6% ASA-II and 71.4% in ASA-III (Anaesthesia *et al.*, 2002).

Conclusion

Our study concludes that the mortality ratio increase with increase ASA Classes showed ASA-III have highest mortality rate in neurosurgical patient that is 71.4% which is very high as compared to ASA Class-I and II.

References

Abu-Elmagd KM. 2012. 'Long-term survival, nutritional autonomy, and quality of life after intestinal and multivisceral transplantation', *Annals of Surgery* **256**(3), p 494–508.
<http://dx.doi.org/10.1097/SLA.0b013e318265f310>.

Anaesthesia AROF, Mortality R. 2002. 'A Review of Anaesthesia Related Mortality 1997-1999', *Safety in anaesthesia in Australia*.

Aronson WL, McAuliffe MS, Miller K. 2003 'Variability in the American Society of Anesthesiologists Physical Status Classification scale', *Journal of the American Association of Nurse Anesthetists* **71**(4), p 265–274.
<http://dx.doi.org/10.21236/ad1012098>.

Australian and New Zealand College of Anaesthetists. 2014. *Safety of Anaesthesia - A review of anaesthesia-related mortality reporting in Australia and New Zealand 2009-2011*.

Brodsky JB. 1995. 'Downloaded from anesthesiology.pubs.asahq.org by guest on 01/28/2019', *Anesthesiology* **31**(4), p 305–309.

Fasting S. 2010 'Risiko ved anesthesi', *Journal of the Norwegian Medical Association* **130**(5), p 498–502.

<http://dx.doi.org/10.4045/tidsskr.08.0666>.

Fu KM. 2011. 'Correlation of higher preoperative American Society of Anesthesiology grade and increased morbidity and mortality rates in patients undergoing spine surgery: Clinical article', *Journal of Neurosurgery: Spine*, **14(4)**, p 470–474.

<http://dx.doi.org/10.3171/2010.12.SPINE10486>.

Hammers R. 2010. 'Neurosurgical mortality rates: What variables affect mortality within a single institution and within a national database? - Clinical article', *Journal of Neurosurgery*, **112(2)**, p 257–264.

<http://dx.doi.org/10.3171/2009.6.JNS081235>.

Ogilvy CS. 2003. 'Neurosurgical clipping versus endovascular coiling of patients with ruptured intracranial aneurysms', *Stroke* **34(10)**, p 2540–2542.

<http://dx.doi.org/10.1161/01.STR.0000092894.71909.FF>.

Sacko ODP, Grenier B. 2007. 'I m s n d l', *Society*, **61(5)**, p 950–955.

<http://dx.doi.org/10.1227/01.NEU.0000280085.60995.95>.

Sağlam M. 2019. 'No An analysis of the cohesive structure of the health sense of the master center and In the elderly at home health related index Title', *FLEPS 2019 -IEEE International Conference on Flexible and Printable Sensors and Systems, Proceedings* **6(1)**, p 1–46.

<http://dx.doi.org/10.1016/j.surfcoat.2019.125084>.

Simon M. 2009. 'Insular gliomas: The case for surgical management - Clinical article', *Journal of Neurosurgery* **110(4)**, p 685–695.

<http://dx.doi.org/10.3171/2008.7.JNS17639>