Anesthesia Techniques for Reductions of Intraoperative and Postoperative Complication and Post-Operative Morbidity and Mortality of Stroke Patients in ICU

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Abstract
Introduction: The significance of stroke in increasing mortality rates in developing nations has been expanding definitively. Cardiovascular infections were the cause of death for 17.5 million individuals in 2012 that is 3 in each 10 individuals died because of aforementioned diseases. 7.4 million individuals of these died due to ischemic coronary illness or heart diseases and the rest of the 6.7 million died due to stroke.

Objective: In this study our main objective is to analyze the effectiveness of the anesthesia techniques for reductions of intraoperative and postoperative complication and post-operative morbidity and mortality of stroke patients in ICU.

Method: This Retrospective study was carried out at the Department of surgery, tertiary care hospital, Sylhet from February 2018 to February 2020 where 200 patients who previous to the stroke, underwent different types of surgeries were randomized to receive thoracic epidural analgesia (TEA) along with general anesthesia (GA) in Group A (100 patients) and only GA in Group B (100 patients) were included the study.

Results: During the study, most of the patients belonged to the 41-50 years’ age group for both Group A (48%) and group B (43%). Most of the patients in group A had faced cardiac surgery and in group B, most of the patients had faced neurologic surgery before stroke.

Conclusion: From our result we can say that, hat, TEA if combined with general anesthesia for surgery provides a comparatively safe rather than only general anesthesia usage which reduces stroke development and stabilizes the patients.

Keyword: TEA, general anesthesia, stroke.
Introduction
In around the world, developed nation’s coronary illness and stroke are the first and second primary reasons for death amongst the adult populace. Cardiovascular infections were the cause of death for 17.5 million individuals in 2012 that is 3 in each 10 individuals died because of aforementioned diseases. 7.4 million individuals of these died due to ischemic coronary illness or heart diseases and the rest of the 6.7 million died due to stroke.

![Figure 1: Two Types of Stroke](image)

However, the significance of stroke in increasing mortality rates in developing nations has been expanding definitively. Twice the same number of deaths from stroke occur in developing nations as also seen in developed nations. By and large, in developing nations, stroke positions in second or third in infection concerns. By 2020, stroke is believed to be the significant reason for death in developing nations. Death rates from stroke for individuals of less than 65 years have fallen by 23% over the most recent 10 years in developed nations, however, in developing nation, it is still it is staying in the progressing state. Over the most recent 10 years, a significant increment in the death rates are purported to happened in the developing nations; like Bangladesh.1-2

In Bangladesh, stroke is the third driving reason for death (8.57%). Among the stroke cases seventy percent to eighty percent deaths are ischemic and the rest of the twenty to thirty percent are hemorrhagic. During the medical procedure are currently over the utilization general sedation alone, combined use of thoracic epidural analgesia.3-5 hereafter, the primary target of this study is to assess the anesthesia techniques for reductions of intraoperative and postoperative complication and post-operative morbidity and mortality of stroke patients in ICU.

Objective

General Objective
To analyze the effectiveness of the anesthesia techniques for reductions of intraoperative and postoperative complication and post-operative morbidity and mortality of stroke patients in ICU.

Specific Objectives
- To identify the causes of stroke,
- To detect the types of surgery that the patients undergoes before stroke, and
- To find out the mortality and morbidity rates of the patients.

Methodology

Type of Study
The study conducted was a retrospective study for which the sampling technique used was purposive. 200 Patients admitted in the Department of Surgery of Tertiary care hospital, Dhaka, that were classified according to the inclusion and exclusion criteria described in the following part of the methodology was taken as a part the study. This study was conducted for two years during the period from February 2018 to February 2020, eighteen months of which was the data collection period.

Inclusion Criteria
The samples for the study were taken based on the following inclusion criteria;
✔ Patients aged ranging 31-60 years of age,
✔ Patient admitted due to stroke, and
✔ Male and female patients.

Exclusion Criteria
Patients aged below 31 years, and Patients associated with valvular heart disease, congenital cardiac anomaly, urgent CABG and re-exploration, associated other systemic (e.g.
hepatic, COPD, renal etc.) were excluded from the study.

**Study Procedure**

200 patients who had different types of surgery for stabilizing stroke were randomized to receive thoracic epidural analgesia and general anesthesia (GA) were classified into Group-A and those who only received GA were put in Group-B, each group consisting of 100 patients. Upon the individual patient’s entry into the operation theater, intravenous cannulation and direct blood pressure monitoring using radial arterial catheterization was established for both groups. As per the existing policies of the hospital, we noted age, gender, drug utilization, type & pattern of operation etc. during the entire operation and experiment. Furthermore, 24 hours of holter monitoring, details of anaesthesia management either general anesthesia or regional anesthesia or combined (general & regional) anaesthesia, coronary angiogram monitoring, and the outcome were also recorded.

**Statistical Analysis**

The results are given as Mean ± SD for all of the independently performed experiments. Unpaired student's "t" test was conducted to show the level of significance.

**Results**

Table-1 shows the age distributions of the patients where most of the patients belong to 41-50 year’s age group for both Group A (48%) and group B (43%).

**Table-1:** Age distributions of the patients. (n=200)

<table>
<thead>
<tr>
<th>Range</th>
<th>Group A %</th>
<th>Group B %</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>2%</td>
<td>7%</td>
</tr>
<tr>
<td>41-50</td>
<td>48%</td>
<td>43%</td>
</tr>
<tr>
<td>51-60</td>
<td>34%</td>
<td>37%</td>
</tr>
<tr>
<td>&gt;60</td>
<td>16%</td>
<td>13%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure-1 shows the gender distributions of the patients. This study patient was divided into Group A and Group B, where in Group A’s 84% were male and 16% were female. In Group B’s 90% and 10% were male and female respectively. The following figure is given below in detail:

**Figure-1:** Gender distributions of the patients. (n=200)

Figure 2 shows the intraoperative complication in the patients where 13% patients in group A faced lung trauma where as in group B it was 25%.

**Table-2:** Intraoperative complication in the patients. (n=200)

Table-2 shows the types of surgery undergone by the patients before stroke, where most (47%) of the patients in group A faced cardiac surgery and in group B most (51%) of the patients faced neurological surgery before stroke.

**Table-2:** Types of surgery undergone the patients before stroke

<table>
<thead>
<tr>
<th>Types of surgery undergoes the patients before stroke</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>9%</td>
<td>18%</td>
</tr>
<tr>
<td>Cardiac</td>
<td>47%</td>
<td>20%</td>
</tr>
<tr>
<td>Vascular</td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>Neuropathy</td>
<td>18%</td>
<td>51%</td>
</tr>
</tbody>
</table>
Table-3 shows the distribution of the patients according to types of stroke, where in Group A 75% patients had ischemic and 25% had hemorrhagic, and in Group B 81% patients had ischemic and 19% had hemorrhagic.

Table-3: Distribution of the patients according to types of stroke. \((n=200)\)

<table>
<thead>
<tr>
<th>Types of strokes</th>
<th>Group A (%)</th>
<th>Group B (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic</td>
<td>75%</td>
<td>81%</td>
</tr>
<tr>
<td>Hemorrhagic</td>
<td>25%</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table-4 shows the X-ray Chest P/A view of both groups of patients in preoperative period, however it was found statistically not significant. On the postoperative follow-up periods, there were significant difference found in both groups of patients.

Table-4: X-ray chest P/A view of both groups of patients in preoperative period. \((n=200)\)

<table>
<thead>
<tr>
<th>X-ray chest P/A view</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Op. CXR (Normal)</td>
<td>53</td>
<td>50</td>
</tr>
<tr>
<td>Post operative follow-up CXR</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table-5 shows the total hospital stay in days, where in group A total 94% patients stay in hospital 6-10 days as group B it was 15%.

Table-5: Total Hospital Stay in Days. \((n=200)\)

<table>
<thead>
<tr>
<th>Total hospital stay</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10 days</td>
<td>94%</td>
<td>15%</td>
</tr>
<tr>
<td>11-15 days</td>
<td>6%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Figure-3 shows the mortality and morbidity rate of the patients where, in group A mortality rate was 19% where as in group B it was 26%. The following figure is given below in detail:

Figure-6: Mortality and morbidity rate of the patients. \((n=200)\)

Discussion
Developed and developing nations have a record history of mortality due to various coronary illnesses and stroke which can be attributed to the living conditions and stress accumulation. Various studies have concluded that one of the primary reasons for death are heart disease in the aforementioned countries.\(^5\) The mortality rate shown in the Heuschmann’s study varied from one hospital to another which ranged from 0 to 25%.\(^6\) Whereas, a study conducted in Ghana found out a higher mortality rate of 17.5% from ischemic stroke than the present study.\(^7\) In the study, several factors were categorized as predictors of in-hospital mortality rate whereupon a bivariate analysis; serum creatinine, and BUN were the factors that proved significant for in-hospital mortality.

In our study, we conducted a study on a total of 200 samples where most of the patients belonged to 41-50 year’s age group for both Group A (48%) and group B (43%). There is no significance difference in age distribution of groups. Similar type of result was shown in several studies done by other investigators.\(^9\)\(^-\)\(^10\) The distribution of gender among the patients in Group A: 85% were male and 15% were female, where in Group B: 91% were male and 9% were female respectively. There were no statistically significant differences for operation duration between two groups were observed. Study done by one article supports this result.\(^8\) The total ventilation time was observed per hour in the both groups of patients. Total ventilation time 6-12 hours in 94% Group A, whereas in group B, it was only 15% respectively; it was statistical significant \((p<0.05)\). Studies conducted by many researchers supported this finding.\(^8\)\(^-\)\(^9\) 89% of Group-A stayed in ICU for 39-40 hours whereas Group B it was only at 11%. In statistical analysis, there was significant difference was found in two groups \((p<0.05)\).

A report showed that, during the preoperative period, after excluding matched pairs, where cases and/or controls had surgical procedures \((cardiac, vascular surgeries, and, neurologic surgeries)\) at
high risk for ischemic stroke. In our study it was found that, 75% patients had ischemic and 25% had hemorrhagic in group A and 81% patients had ischemic and 19% had hemorrhagic in group B.

Conclusion
It can be concluded that, TEA if combined with general anesthesia for surgery provides a comparatively safe rather than only general anesthesia usage which reduces stroke development and stabilizes the patients. Further study is needed for a more thorough analysis and a more informed outcome.

References: