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ROLE OF DEXMEDETOMIDINE IN CARDIAC SURGERY PATIENTS AND INCIDENCE OF DELIRIUM

Abstract: Objective: This study was conducted to determine benefits of dexmedetomidine use as a post operative sedative agent in patients after cardiac surgery.

Study Design and Duration: This is a comparative study of prospective randomized trial. Study was started in January 2018 and completed in September 2018 comprising on total duration of 9 months.

Setting: This study was conducted in National institute of cardiovascular surgery Karachi.

Patients and Methods: Patients admitted in the study institution and planned for any type of cardiac surgery were divided into three groups. After operation they were given three types of drugs for sedation dexmedetomidine, Midazolam and propofol and outcome of these drugs was recorded. Total 130 cases were included in this study. In two groups each comprising on 45 cases dexmedetomidine and Midazolam were given. In third group, consisted of 40 cases, propofol was given post operatively. Effects of these drugs were documented. Age of patients, hospital stay, mean ICU stay, incidence of delirium and male and female distribution of cases was documented. Patients having delirium after cardiac surgery were given haloperidol and lorazepam as a treatment.

Results: Out of total 130 cases 45(34.6%) were given dexmedetomidine, other 45(34.6%) cases were given midazolam and 40(30.7%) cases were given propofol as a sedative agent after cardiac surgery. Age range was 18-65 years with mean age 43.5 years. In dexmedetomidine group there were 22% cases below 20 years, 33% between 20-40 years, 20% between 41-60 years and 13.3 cases above 60 years. In Midazolam and propofol groups 17.7% & 30% were below 20 years, 35.5% & 25% between 20-40 years, 37.8% & 32.5% between 41-60 years, 8.9% & 12.5% respectively were above 60 years. Incidence of delirium among the cases given dexmedetomidine was 6.7%, in midazolam group 40% and in propofol group was 37.5%.

Conclusion: Dexmedetomidine is an effective drug in post operative patients after cardiac surgery as it reduces postoperative delirium in these patients and helps in early recovery of patients.

Key words: Dexmedetomidine, Cardiac surgery, Delirium, Post operative sedation.

Language: English

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Introduction

After cardiac surgery neuronal activity in the body of patients becomes abnormal and systemic metabolic changes also take place which causes post operative delirium in patients.¹⁻³ It is an abnormal

mental state which occurs in about 57% of patients after cardiac surgery.⁴ It is also common in patients admitted in medical and surgical units and is more prevalent in the patients admitted in ICU who are critically ill.⁵ Delirium state is associated with high



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morbidity and mortality. In this study patients after cardiac surgery were treated with three types of sedative drugs dexmedetomidine, propofol and midazolam. These drugs reduce postoperative pain in patients and help in recovery. It was seen that effect of dexmedetomidine was more than other drugs.⁶ Group of patients given dexmedetomidine recover earlier than other patients which were given propofol and midazolam and hospital stay was also less in those cases as compared to others.⁷ Delirium is a state which is difficult to diagnose in patients and therefore most of the times it is neglected and such patients suffer from this disease and die.⁸⁻¹⁰ Very skilled staff of health professionals is required for early diagnosis and treatment of this disease. According to a study about 30-80% cases with delirium are not diagnosed by doctors.¹¹⁻¹⁴ Very few patients having delirium during hospital stay recover from this before discharge and most of them are untreated and undiagnosed for this disease. Definitive causes of delirium have not been identified yet. Risk factors of this disease include previous mental illness, old age, history of medicines intake like benzodiazepines, lack of proper sleep, hypoxia, anorexia, alcohol consumption, metabolic disease and drug abuse.¹⁵ Patients undergoing any major surgery are at high risk of developing delirium postoperatively so these cases require proper care regarding medical, surgical and psychological issues.¹⁶ Burden of previous surgery and acute illness is a main risk factor of the disease.¹⁷⁻²⁰ Cardiac surgery patients have more risk of developing this illness as compared to other surgical patients so these cases require special care regarding this issue and goal of treatment is to diagnose the disease early in the same hospital stay and should be treated before discharge of the patient.

Patients and Methods

This is a comparative study. It was conducted in National institute of cardiovascular surgery located in Karachi. Study was completed in a total duration of nine months. This is a comparative study in which effects of various drugs were compared with each other. Patients admitted in the study institution and planned for cardiac surgery were divided into three groups. After operation they were given three types of drugs for sedation dexmedetomidine, Midazolam and propofol and outcome of these drugs was recorded. Total 130 cases were included in this study. In two groups each comprising on 45 cases dexmedetomidine and Midazolam were given. In third group, consisted of 40 cases, propofol was

given post operatively. Effects of these drugs were documented. Age of patients, hospital stay, mean ICU stay, incidence of delirium and male and female distribution of cases was documented. Patients having delirium after cardiac surgery were given haloperidol and lorazepam as a treatment. Informed consent was taken from all patients included in the study and consent was also taken from the ethical committee of the hospital for conducting study. Privacy of data of all patients was maintained. Both male and female patients were included in the study group. P-value below 0.05 was considered significant. All data related to study was documented and analyzed using Microsoft office and statistical software version 2017. Results were calculated in the form of frequencies, percentages and means. Results were expressed in the form of tables and graphs.

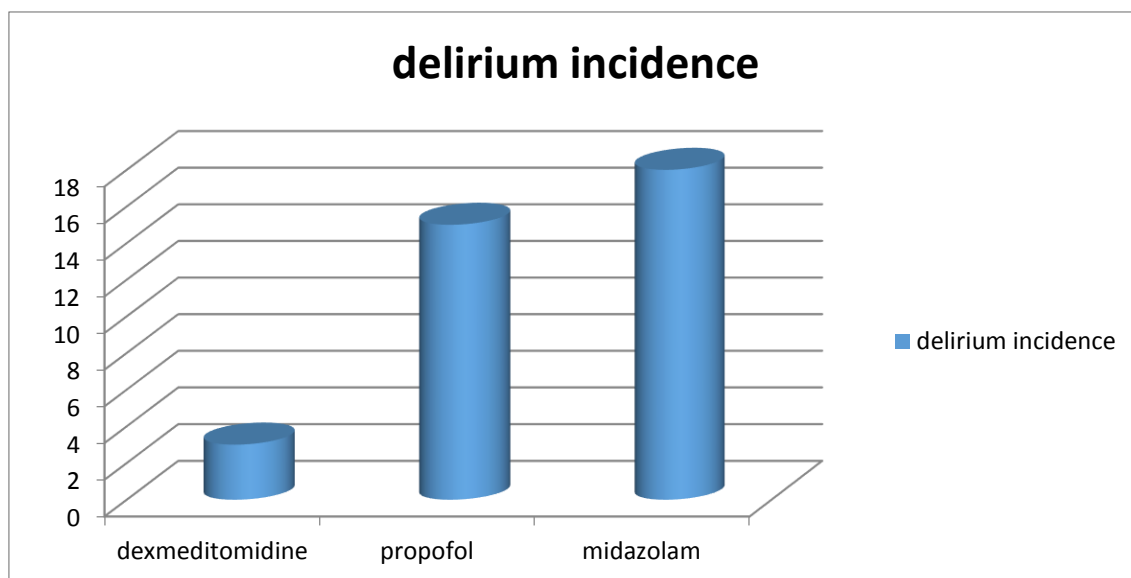
Results

Out of total 130 cases 45(34.6%) were given dexmedetomidine, other 45(34.6%) cases were given midazolam and 40(30.7%) cases were given propofol as sedative agent after cardiac surgery. Age range was 18-65 years with mean age 43.5 years. In dexmedetomidine group there were 10(22%) cases below 20 years, 15(33%) between 20-40 years, 9(20%) between 41-60 years and 6(13.3%) cases above 60 years. In Midazolam and propofol groups 8(17.7%) & 12(30%) were below 20 years, 16(35.5%) & 10(25%) between 20-40 years, 17(37.8%) & 13(32.5%) between 41-60 years, 4(8.9%) & 5(12.5%) respectively were above 60 years. In dexmedetomidine group there were 23(51.1%) male and 22(48.9%) female cases. In midazolam group 25(55.5%) were male and 20(44.4%) were female cases. In propofol group 24(60%) were male and 16(40%) were female cases. Incidence of delirium among the cases given dexmedetomidine was 6.7%, in midazolam group 40% and in propofol group was 37.5%. Mean hospital stay in dexmedetomidine group was 7.4 days, that in midazolam and propofol group was 9.6 and 10.5 days respectively. Mean ICU stay in these cases was 1.8, 2.7 and 2.5 days respectively in dexmedetomidine, midazolam and propofol group. Which patients developed delirium were treated with haloperidol 8.9% cases in midazolam group and 17.5% cases in propofol group and no case in dexmedetomidine group treated with haloperidol. While 2(4.4%) cases in dex. group, 4(8.9%) cases in midazolam group and 7(17.5%) cases in propofol group.



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Graph-1. Incidence of delirium among three groups of study population.

Table-1. Post operative characteristics of patients in three groups of study population.

	Dexmedetomidine group (n=45)		Midazolam group (n=45)		Propofol group (n=40)		P-value
	N	%	N	%	N	%	
Age (years)							
≤20	10	22	8	17.7	12	30	0.001
20-40	15	33	16	35.5	10	25	
41-60	14	31.1	17	37.8	13	32.5	
Above 60	6	13.3	4	8.9	5	12.5	
Male cases	23	51.1	25	55.5	24	60	0.13
Female cases	22	48.9	20	44.4	16	40	0.14
Incidence of delirium	3/45	6.7	18/45	40%	15/40	37.5	0.05
Mean ICU stay (days)	1.8		2.7		2.5		0.001
Mean Hospital stay (days)	7.4		9.6		10.5		0.001
Use of medicines for Delirium							
Haloperidol	0/45		6/45	13.3	5/40	12.5	0.12
Lorazepam	2/45	4.4	4/45	8.9	7/40	17.5	0.11

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Discussion

This study is prospective in which randomized trials were done. This study showed that use of dexmedetomidine is effective in reducing incidence of delirium among post operative cardiac surgery patients as compared to other sedative drugs such as propofol and midazolam which have no significant effect.²¹ After major surgery patient may develop delirium which is an abnormal mental state with impaired cognitive functions.²²⁻²⁵ This condition is associated with high morbidity and mortality rate.^{26,27} This is common among male and female patients both with slightly female predominance.²⁸ It is also common in patients admitted in medical and surgical units and is more prevalent in the patients admitted in ICU who are critically ill.²⁹ Delirium state is associated with high morbidity and mortality. In this study patients after cardiac surgery were treated with three types of sedative drugs dexmedetomidine, propofol and midazolam. These drugs reduce postoperative pain in patients and help in recovery.³⁰ It was seen that effect of dexmedetomidine was more than other drugs. Group of patients given dexmedetomidine recover earlier than other patients which were given propofol and midazolam and hospital stay was also less in those cases as compared to others. Delirium is a state which is difficult to diagnose in patients and therefore most of the times it is neglected and such patients suffer from this disease and die.³¹ Very skilled staff of health professionals is required for early diagnosis and treatment of this disease. According to a study about 30-80% cases with delirium are not diagnosed by doctors.³² This is a comparative study. It was conducted in National institute of cardiovascular surgery located in Karachi. Study was completed in a total duration of nine months. This is a comparative study in which effects of various drugs were compared with each other. Patients admitted in the study institution and planned for cardiac surgery were divided into three groups. After operation they were given three types of drugs for sedation

dexmedetomidine, Midazolam and propofol and outcome of these drugs was recorded. Out of total 130 cases 45(34.6%) were given dexmedetomidine, other 45(34.6%) cases were given midazolam and 40(30.7%) cases were given propofol as sedative agent after cardiac surgery. In midazolam group 25(55.5%) were male and 20(44.4%) were female cases. In propofol group 24(60%) were male and 16(40%) were female cases. Incidence of delirium among the cases given dexmedetomidine was 6.7%, in midazolam group 40% and in propofol group was 37.5%. Informed consent was taken from all patients included in the study and consent was also taken from the ethical committee of the hospital for conducting study. Privacy of data of all patients was maintained. Both male and female patients were included in the study group. Incidence of delirium among the cases given dexmedetomidine was 6.7%, in midazolam group 40% and in propofol group was 37.5%. Mean hospital stay in dexmedetomidine group was 7.4 days, that in midazolam and propofol group was 9.6 and 10.5 days respectively. In patients after cardiac surgery multidisciplinary approach for treatment of surgical, medical and psychiatric issues is very useful which may reduce incidence of delirium. Some studies have shown association between use of opiate drugs and incidence of delirium. Studies showed that postoperative patients when treated with dexmedetomidine don't require opiate hence incidence of delirium is reduced.

Conclusion

After major surgeries and especially cardiac surgery patients are much likely to develop an abnormal mental state called delirium. Its incidence can be reduced effectively by use of dexmedetomidine after surgery which is also associated with early recovery and less hospital stay as compared to other patients not treated with this. Multidisciplinary approach including physician, surgeon and psychiatrist is necessary for treatment of such patients.

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