

Comparison of Intravenous Hydralazine–Bolus Dose Versus Continuous Infusion Drip in Eclampsia

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The leading cause of maternal death from eclampsia is cerebral hemorrhage, which is presumably the consequence of severe hypertension, so the acute elevations in blood pressure above 160/100 mm Hg should be brought under control. A study of forty diagnosed cases of eclampsia was carried out in Lady Willingdon Hospital, Lahore to determine the time and quantity of drug required to control high blood pressure levels by intravenous hydralazine bolus dose versus continuous infusion drip. Patients were divided into control and case group. In control group continuous infusion was given and in cases bolus dose was given. Mean time taken to control blood pressure by continuous infusion was 124.75 minutes and drug quantity was 23.50 mg while it was 52 minutes and 12.25 mg in case of bolus method. The study showed that 60-70% less time was required and 37.5-50% less drug quantity was used in bolus method versus continuous infusion of intravenous hydralazine. Regarding efficacy of intravenous hydralazine, it was found to be statistically superior in this study ($P < 0.05$) so that management strategy should be changed in favour of bolus dose as compared to continuous infusion of intravenous hydralazine.

Key words: Eclampsia, hydralazine, proteinuria

Hypertensive disorders are among the most common and yet serious conditions seen in obstetrics¹. These disorders cause substantial morbidity and mortality for both mother and fetus, despite improved prenatal care^{1,2}. The etiology of hypertension unique to pregnancy remains controversial.

Pregnancy can both aggravate preexisting hypertension and induce hypertension in woman who were previously normotensive³. Despite extensive research, it still remains controversial how pregnancy aggravate or causes hypertension, and delivery remains the ultimate goal of reversing this disease process^{3,4}.

Because of the great potential for serious ill effects in both the mother and fetus newborn, the health care attendant should identify patients at high risk for this disorder and maintain stringent vigilance for early signs during the antenatal period. It is fortunate that with timely detection and prompt management, pregnancy induced hypertension can often be ameliorated and eclampsia largely prevented.

It appears that 2% to 10% of unselected gravidas will develop pre-eclampsia^{5,6}. The incidence of eclampsia is one per 1-2000 deliveries^{7,8}.

Patients with eclampsia require immediate obstetric consultation and admission to an intensive care setting for supportive care and treatment until delivery of the neonate⁹.

The basic principles in the management of antepartum eclampsia involve the following measures:

- support of maternal vital functions.
- control of convulsions and prevention of recurrent convulsions.
- correction of maternal hypoxemia or acidemia.
- control of severe hypertension.
- initiation of the process of delivery.

Antihypertensive therapy for treating severe hypertension has two main objectives:

- i) to reduce the maternal morbidity and mortality associated with seizures, pulmonary emboli, and cerebrovascular accidents without compromising uteroplacental blood flow, which is already reduced in eclampsia.
- ii) to reduce the perinatal morbidity and mortality associated with intrauterine growth restriction, placental infarctions, and placental abruption^{10,11}.

Methods and materials:

Forty patients who presented with clinical diagnosis of eclampsia in emergency of Lady Willingdon Hospital, Lahore, were entered in the study. These patients were divided into control and case group by using random number table.

In control group, intravenous hydralazine continuous infusion drip was started at flow rate of 200 μ g / min. (20 mg / ml ampoule was diluted in 100 cc N/S in microburette and started at rate of 60 microdrops per minute) and when diastolic blood pressure was lowered down to 90-95 mmHg then infusion was maintained at flow rate of 50 μ g / min. (i.e. at 15 microdrops per minute).

In cases, intravenous hydralazine bolus dose 5 mg stat was given and repeated after 20-30 minutes and maximum four bolus doses were given. Aim was to reduce diastolic blood pressure between 90-95 mmHg. Basically, time required to achieve therapeutic goal was noted and compared to see which method was effective so that management strategy could be changed to control blood pressure. The data of all patients was entered on proforma

Results:

Forty patients were entered in the study with mean age of 28.3 years. Among these, 16 patients were between the age group of 21-25yrs (40%), 15 patients were between the age group of 26-30yrs (37.5%), and 9 patients were between the age group of 31-36yrs (22.5%).

Considering gravidity, 30 patients were primigravidas (75%) while 10 patients were multigravidas (25%).

Regarding gestational age, mean was 35.4 wks gestation. In this study 10 patients presented between 28-32 wks gestation (25%), 17 patients presented between 32-36 wks gestation (42.5%) and 13 patients were between 36-40 wks gestation (32.5%).

Minimum diastolic blood pressure was 110 mmHg and maximum was 140 mmHg while mean was 120.75 mmHg.

In the control group, hydralazine continuous infusion was given while in the study group, bolus doses were given. In this study, 17 patients presented with diastolic blood pressure of 110 mmHg. Out of these, 8 patients were treated with continuous infusion, in which blood pressure was reduced to 90-95 mmHg in 100 minutes. While in other 9 patients, bolus doses were given and time taken to control blood pressure was 40 minutes.

In 10 patients, diastolic blood pressure was 120 mmHg. Five patients were given continuous infusion and time noted was 120 minutes. While other 5 patients were given bolus doses and time noted was 60 minutes.

Six patients presented with diastolic blood pressure of 130 mmHg. Continuous infusion was given in 3 patients and time taken to achieve therapeutic goal was 160 minutes. While bolus doses were given in other 3 patients and time noted was 60 minutes.

In 7 patients, diastolic blood pressure was 140 mmHg. Four patients were given continuous infusion and time taken to control the blood pressure was 160 minutes. While in other 3 patients bolus doses were given and time taken to lower down blood pressure was 80 minutes.

Mean time taken to control blood pressure by continuous infusion was 124.75 minutes while it was 52 minutes in case of bolus method.

In view of all the above details, less time was required to achieve therapeutic goal of 90-95 mm Hg by bolus method as compared to continuous infusion method of intravenous hydralazine.

In the continuous infusion group, the drug quantity used for lowering the diastolic blood pressure from 110 mmHg to 90-95 mmHg was 20 mg. It was 24 mg in patients presented with diastolic BP of 120 mmHg. While it was 32 mg in patients presented with diastolic BP of 130 and 140 mmHg.

While in bolus group, the drug quantity used to achieve the therapeutic goal of 90-95 mmHg was 10 mg in patients presented with diastolic BP of 110 and 120 mmHg. It was 15 mg in patients presented with diastolic

BP of 130 mmHg. While it was 20 mg in patients presented with diastolic BP of 140 mmHg.

Mean quantity of drug used to control blood pressure by continuous infusion method was 23.50 mg while it was 12.25 mg in case of bolus method.

Regarding the above details, less quantity of drug was used to achieve therapeutic goal by bolus method as compared to continuous infusion method.

In conclusion it was seen that 60-70% less time was required and 37.5-50% less drug quantity was used in bolus method versus continuous infusion of intravenous hydralazine.

Discussion:

Eclampsia is a well known entity in obstetrical history. It is really a desperate, acute, life threatening, and obstetric emergency for both the mother and the fetus, requiring immediate attention. It is a universal syndrome and major killer of woman in most parts of the world. It is more common in developing countries as compared to the developed ones¹⁵.

Lot of research work has been carried out since centuries to overcome this catastrophe. There are many drugs available to treat such suffering patients but out of them hydralazine is one of the major drug being used and has shown excellent results regarding management of eclamptic patients.

Hydralazine can be administered in bolus dose or continuous infusion drip. I have compared the results of two types of administrations of this drug. This study was carried out in Lady Willingdon Hospital. Forty patients were entered in the study with mean age of 28 year, minimum age was 21 yrs and maximum was 36 yrs. During the study period, 75% patients were primigravidas and 25% were multigravidas. Most patients in the study presented between gestational age of 33 wks - 36 wks with mean gestational age of 35.4 wks. Mean systolic BP was 162mmHg, with range from 140-190mmHg. It was diastolic BP which remained mainstay during treatment. Mean diastolic BP during the study was 120.75 mmHg with range from 110-140 mmHg. During this study period, 80% patients presented in antepartum period, 12.5% patients presented during intrapartum phase and 7.5% patients presented with post partum eclampsia.

A similar study was conducted in New Womens Hospital, Doha, Qatar which reported mean age of 27yrs, minimum age was 18yrs and maximum was 45yrs. This study reported that eclampsia is a disease of primigravid patients especially young primigravidas, when it affects the multiparous patients it is usually superimposed upon essential hypertension. In this study, mean gestational age was 36 wks and range was 29 - 41 wks. This study reported same mean systolic BP with range from 120-200 mmHg. In contrast to my study, this study undertaken in Doha, Qatar reported mean diastolic BP of 102 mmHg with range from 80-130mmHg. The same study reported

36.3% antepartum, 18% intrapartum and 45.4% post partum eclampsia¹⁶.

A study undertaken at Rajavithi Hospital, Bangkok, at Bethesda North Medical Centre, America, and at Medical Centre of Dallas, Texas, USA proved that the hydralazine is the drug of choice for short term control of B.P. in eclamptic patients¹². In contrast to all these results, a study undertaken at Womens Hospital and Health Centre of Canada did not support the use of hydralazine as first line therapy¹⁴.

In this study, mean time taken to control blood pressure by continuous infusion method was 124.5 minutes, minimum time was 100 minutes and maximum time was 160 minutes with $P < 0.05$. A study undertaken at Dhaka Medical College, Bangladesh reported mean time of 186.3 minutes, minimum time was 106 minutes and maximum time was 266 minutes with $P < 0.01$ ¹³. Another study reported from Dallas, Texas, USA showed the similar results as shown in this study¹². Mean time taken to control blood pressure by bolus method was 52 minutes, minimum time was 20 minutes and maximum time was 80 minutes. A study in Dallas, Texas, USA reported the similar results¹². Another study undertaken at Dhaka Medical College, Bangladesh reported mean time of 65.2 minutes, minimum time was 42 minutes and maximum time was 88 minutes, these results were also more or less similar to this study¹³.

In this study, the mean drug quantity used in continuous infusion method was 23.50mg, minimum was 20mg and maximum was 32mg. A study reported from Dhaka Medical College showed mean drug quantity of 20.07 ± 11.38 mg. Mean drug quantity used in bolus method was 12.25mg, minimum was 10mg and maximum was 20mg. A study undertaken at Dhaka Medical College, Bangladesh reported mean of 6.6 ± 1.66 mg³⁷.

Regarding an overall impression based on this study was less time and less quantity of drug was used to control the blood pressure by bolus method of hydralazine as compared to the continuous infusion of hydralazine ($P < 0.05$).

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