

*Research Article*

## Cardiac Complications In Neonates With Hypoxic Ischemic Encephalopathy

**Salah M. Saleh, Abdelhakim A. Abdelhakim, Sayed Sh. Mahmoud  
and Wafaa El. Sedik**

Department of Pediatrics, El-Minia Faculty of Medicine

### Abstract

**Introduction:** Neonatal hypoxic ischemic encephalopathy (HIE). **Aim of the work:** The aim of this study is to: Assess cardiac complications in neonates with Hypoxic Ischemic Encephalopathy. **Patients And Methods:** This is a prospective study included 50 neonates (33 males and 17 females) aged from 1:5 days. **Results:** This study included 50 neonates (33 males and 17 females) aged from 1:5 days. **Discussion:** Hypoxic-ischemic encephalopathy (HIE). **Conclusion and Recommendations :** From the previous results it can be concluded that: The present study found that cardiac Troponin T level was significantly higher in neonates with HIE than normal neonates. Also, Troponin T level strongly correlated with degree of hypoxia.

**Keywords:** CVS: Cardiovascular system, HDL: High Density Lipoprotein, LV: Left Ventricle  
MI: Myocardial infarction

### Introduction

Neonatal hypoxic ischemic encephalopathy (HIE), the most common neurologic complication in the neonatal period, is a major cause of chronic disability in childhood<sup>(1)</sup>. Hypoxic ischemic encephalopathy is termed as neonatal encephalopathy that results from systemic hypoxemia and decreased cerebral perfusion leading to ischemia<sup>(2)</sup>. Also, Hypoxic ischemic encephalopathy (HIE), is associated with a high mortality and morbidity rate, including cerebral palsy, mental retardation, and seizures<sup>(3)</sup>. The etiology of perinatal HIE includes those circumstances that can affect the cerebral blood flow in the fetus and newborn compromising the supply of oxygen to the brain. These circumstances may develop ante-partum (20%), intrapartum (30%), antepartum and intrapartum (35%), or postpartum (10%). HIE develops in the setting of perinatal asphyxia, which is a multi-organ system disease<sup>(4)</sup>.

Several hazard elements are associated with HIE. These include low birth weight, low Apgar score, low pH and hemoglobin level, as well as delivery by unskilled birth attendants, prolonged second stage of labor, delivery in

nongovernmental hospitals, bad antenatal care, post- term gestation, vacuum extraction, male sex, and prolapsed cord<sup>(5)</sup>.

### Aim of the Work

**The aim of this study is to:**

Assess cardiac complications in neonates with Hypoxic Ischemic Encephalopathy.

### Patients And Methods

This is a prospective study included 50 neonates (33 males and 17 females) aged from 1:5 days. All neonates were recruited from the Neonates tertiary care unit at El-Minia University hospital, Minia governorate during the period from April 2016 to January 2017. The study was approved by the faculty of medicine, Minia University ethical committee. The aim of this study was to assess cardiac complications in neonates with hypoxic ischemic encephalopathy.

*The studied neonates were classified into two groups:*

➤ **Group (I): Twenty-five** neonates with hypoxic ischemic encephalopathy.

➤ **Group (II): Twenty-five** healthy neonates apparently age and sex matched with cases group as a control group.

*Patients were chosen according to the following:*

✚ **Inclusion criteria:**

- 1) Five minutes Apgar score of <5, metabolic acidosis indicated by a base deficit > 16mmol/L and/or delayed onset of respiration for five or more minutes.
- 2) Neonates who needed mechanical ventilation.
- 3) Neonates with evidence of encephalopathy as altered consciousness and/or, seizures.

✚ **Exclusion criteria:**

- 1) Preterm neonates <37 weeks of gestation.
- 2) Neonates with congenital anomalies

including dysmorphism, congenital viral infections, inborn error of metabolism and hemorrhagic shock without evidence of intrapartum asphyxia.

**Results**

This study included 50 neonates (33 males and 17 females) aged from 1:5 days. All studied neonates were classified to two groups:

➤ **Group (I):** Included Twenty-five neonates with hypoxic Ischemic encephalopathy.

➤ **Group (II):** Included Twenty-five apparently healthy neonates and age and sex matched with cases group as a control group.

The results are shown in tables (4:14) and figures (13 :27) as follows:

**Table: Comparison between cases and control groups regarding Demographic and obstetrical data.**

Variable		Cases (n=25)	Controls (n=25)	P. value
Age (day)		2.1 ± 1.1	2.9 ± 1.2	<b>0.05</b>
Gestational age (wk)		39.2 ± 1.6	39.4 ± 1.3	0.54
Weight (kg)		3.22 ± 0.37	3.04 ± 0.33	0.10
Mode of delivery	Vaginal	14 (56.0%)	12 (48.0%)	0.57
	Caesarian	11 (44.0%)	13 (52.0%)	
Obstetrical problems	No	0	22 (88.0%)	<b>&lt;0.01</b>
	Maternal disease	3 (12.0%)	1 (4.0%)	
	Placenta abnorm.	3 (12.0%)	1 (4.0%)	
	PROM	7 (28.0%)	1 (4.0%)	
	Obstructed labor	12 (48.0%)	0	

**P. value ≥ 0.05 Not Significant**

**P. value < 0.05 Significant**

**P. value < 0.01 Highly Significant**

**Discussion**

Hypoxic-ischemic encephalopathy (HIE) is described as a clinically defined syndrome of disturbed neurologic function in the earliest days of life in an infant born at or beyond 35 weeks of gestation, manifested by a subnormal

level of consciousness or seizures, and often accompanied by difficulty with initiating and maintaining respiration and depression of tone and reflexes. It was reported that the incidence of neonatal hypoxic-ischemic encephalopathy (HIE) is 1.5-6 per 1,000 live births, remains one

of the leading causes of neonatal mortality, morbidity, and permanent neurological and neurodevelopmental disability in developing countries. It was reported that the newborn myocardium is preferentially spared during the early phase of newborn hypoxemia; however, evidence of myocardial injury is present in 29:78% of newborns diagnosed with hypoxic-ischemic encephalopathy (HIE) (Hankins et al., 2002 & Shah et al., 2004). Oxygen deprivation secondary to a hypoxic-ischaemic event is thought to cause myocardial damage<sup>(6)</sup>

### Conclusion and Recommendations

*From the previous results it can be concluded that:*

- ✚ The present study found that cardiac Troponin T level was significantly higher in neonates with HIE than normal neonates. Also, Troponin T level strongly correlated with degree of hypoxia.

- ✚ Echocardiographic finding were found in 16% of neonates with HIE.

- ✚ Cardiac troponin T assay and echocardiographic evaluation is useful in evaluating the severity of myocardial damage in perinatal asphyxia.

- ✚ Cardiac Troponin T had high sensitivity for diagnosing HIE. So, we recommend assessing it in neonates suspected as HIE or asphyxiated ones because is inexpensive, readily available, provides a result within hours that correlates well with the degree of myocardial dysfunction.

- ✚ Further studies with bigger sample are recommended for more evaluation of cardiac complications in neonates with Hypoxic Ischemic Encephalopathy .

### References

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