

## Effect of Earlier Potassium Addition in Intravenous Fluid of Newborn

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### ABSTRACT

**Aim:** To detect the effect of earlier potassium addition in intravenous fluid of newborn.

**Study design;** Quazi experimental study.

**Place and duration of study:** This study was conducted in two and half years at Aziz Bhatti Shaheed Teaching Hospital Gujrat from January 2014 to June 2016.

**Methods:** Total 200 newborns were selected for study who were delivered after 37 weeks of gestation. Newborns were received in pediatrics emergency and admitted in nursery. Newborns having poor sucking due to birth asphyxia were included in the study. Newborns were diagnosed on history, examination and all the necessary investigations were advised. Two groups were made group A and group B, each group was having 100 newborns. All newborns who were having gestational age less than 37 weeks, babies with congenital heart disease, any renal problem and babies in very sick condition were excluded from the study. After admission in nursery all the necessary treatment was started. All the newborns were kept on intravenous fluid for three days. After assessment of adequate urine output, in group A potassium was added in the start of second day of life and on other hand in group B potassium was added at the end of third day of life. Baby was observed for abdominal distention on start of fourth day of life.

**Results:** In our study, we observed effect of earlier addition of potassium in intravenous fluid of newborns admitted in hospital. On fourth day of life, tolerance of first feed was also observed. In our study, in group A 2(2%) newborns showed potassium level below 3.5mEq/L at the start of second day of life. While, in group B (potassium started at the end of third day of life) 01 (1%) newborn showed potassium level below 3.5 mEq/L at the start of second day of life. On other hand, in group A (potassium started at start of second day of life) no newborn (00%) showed potassium level below 3.5mEq/L at the end of third day of life. While, in group B 5(5%) newborns showed potassium level below 3.5mEq/L at the end of third day of life. In our study, feed which was given at the start of fourth day of life, in group A 1(1%) newborn showed mild abdominal distention intolerance at fourth day of life.

**Conclusions:** Early addition of potassium in intravenous fluid of premature babies may decrease the chances of abdominal distention and may help in starting milk in early days of life. It may decrease the number of days of admission of newborn babies in nursery.

**Keywords:** IV fluid, newborn, potassium addition

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### INTRODUCTION

In broad category a full term baby is 37 to 40 weeks of gestation and premature is a neonate born before 37 weeks of gestation<sup>1,6</sup>.

Ballard scoring system takes physical and neurological characteristics of newborn to diagnose prematurity. Close monitoring of fluid and electrolyte is very important in neonates. For the management of fluid and electrolytes; serum sodium, potassium, calcium, glucose, daily weight and urine output is extremely important to measure regularly along with clinical assessment of premature babies. Before 24 hours of age electrolytes should not be added in maintenance fluid of premature. There must be adequate urine output assurance before addition of electrolytes in fluid. Potassium is needed 1-2 mEq/kg/day and other electrolytes like sodium and calcium are also necessary<sup>1,2,3</sup>.

Intestinal obstruction in neonates is common. It may be mechanical or functional obstruction or paralytic obstruction. Motility disorders of the gut account for upto 15% of pediatric patients with abdominal distention and most severe form may be the pseudo-obstruction. In the newborn Hirsch-sprung disease, necrotizing entero-colitis, toxic mega-colon with perforation is very important to discuss in the differential diagnosis of intestinal obstruction because of their high mortality<sup>4,5</sup>.

According to the statement of the American academy of Pediatrics human milk saves the baby from abdominal distention and other gastrointestinal complications like necrotizing enterocolitis<sup>7</sup>.

Hypokalemia may be defined as serum level of potassium below the normal value, normal serum level of potassium is 3.5-5mEq/L. Low serum potassium level may cause many problems in pediatric patients and one of them is abdominal distention without any mechanical obstruction<sup>8</sup>.

Decreased intestinal motility may be the cause of abdominal distention and ileus in pediatric patients. Abdominal distention and ileus may be seen even after normalization of the thyroid hormones in patients with hypothyroid patients. Underlying other causes of ileus must be in consideration like intestinal cells<sup>9,10</sup>.

Serum potassium may change the intestinal propulsion forces but it may be related to the intracellular potassium, but not extracellular, total potassium deficiency may cause intestinal paralysis<sup>11,12,13</sup>.

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## MATERIALS AND METHODS

Total 200 newborns were selected for study who were delivered after 37 weeks of gestation. newborns were received in pediatrics emergency and admitted in nursery. Newborns having poor sucking due to birth asphyxia were included in the study. Newborns were diagnosed on history, examination and all the necessary investigations were advised. Two groups were made group A and group B, each group was having 100 newborns. All newborns who were having gestational age less than 37 weeks, babies with congenital heart disease, any renal problem and babies in very sick condition were excluded from the study. After admission in nursery all the necessary treatment was started. All the newborns were kept on intravenous fluid for three days. Every enrolled newborn was assessed for effective sucking at the end of third day of life and if there is no sucking due to severity of disease then the newborn was excluded from the study. After assessment of adequate urine output, in group A potassium was added in the start of second day of life and on other hand in group B potassium was added at the end of third day of life. Baby was observed for abdominal distention on start of fourth day of life. On fourth day of life oral milk was started after assessment of the condition of the newborns baby. Milk was started if there was no abdominal distension, sucking of baby was good and no respiratory distress. Milk was given two hourly and every newborn baby was assessed before and after one hour of each feed for abdominal distention. If abdominal distention was observed in newborn babies then feed was stopped, nasogastric decompression was done, serum potassium level was achieved and surgical opinion was taken. The newborns who did not tolerate milk were kept under observation for one more day. On next day feed was given and discharged home after final assessment

All babies in both groups were discharged home after treatment in the nursery and follow up was advised. All the data was recorded and analyzed.

## RESULTS

In our study, we observed effect of earlier addition of potassium in intravenous fluid of newborns admitted in hospital. On fourth day of life, tolerance of first feed was also observed. In our study, in group A (potassium started at start of second day of life) 2(2%) newborns showed potassium level below 3.5 mEq/L at the start of second day of life. While, in group B (potassium started at the end of third day of life) 1(1%) newborn showed potassium level below 3.5mEq/L at the start of second day of life (Table 1)..

On other hand, in group A (potassium started at start of second day of life) no (00%) newborn showed potassium level below 3.5 mEq/L at the end of third day of life. While , in group B (potassium started at the end of third day of life) 5(5%) newborns showed potassium level below 3.5 mEq/L at the end of third day of life (Table 1)..

In this study, feed which was given at the start of fourth day of life, in group A (potassium started at start of second day of life) 01 (1%) newborn showed mild abdominal distention/feed intolerance at fourth day of life. While , in group B (potassium started at the end of third day of life) 07 (7%) newborns showed mild abdominal distention/feed intolerance at fourth day of life (Table 2).

In this study, in group A (potassium started at start of second day of life) only 1(1%) newborn was discharged on fifth day of life. While, in group B (potassium started at the end of third day of life) 7(7%) newborns were discharged on fifth day of life. On other hand, in group A (potassium started at start of second day of life) 9 (99%) newborn was discharged on fourth day of life. While, in group B (potassium started at the end of third day of life) 93(93%) newborns were discharged on fourth day of life (table NO-03).

All the patients in the study recovered and discharged home after final assessment.

Table 1: Potassium levels (n=200)

Group	At start of second day of life		At end of third day of life	
	Potassium <3.5 meq/l	Potassium 3.5 to 5 meq/l	Potassium <3.5 meq/l	Potassium 3.5 to 5 meq/l
Group-A n=100 (potassium started at start of second day of life)	02 (2%)	98 (98%)	00 (0%)	100 (100%)
Group-B n=100 (potassium started at end of third day of life)	01 (1%)	99 (99%)	05 (5%)	95 (95%)
Total	03 (1.5%)	197 (98.5%)	05 (2.5%)	195 (97.5%)

Table 2: Abdominal distention after start of feed (n=200)

Group	Mild abdominal distention after start of feed/ feed intolerance	Feed tolerated normally
Group-A (n=100) (potassium started at start of second day of life)	01 (1%)	99 (99%)
Group-B (n=100) (potassium started at end of third day of life)	07 (7%)	93 (93%)

Table 3: Hospital stay of newborn (n=200)

No. Of days of hospital stay of newborn	Group-A (n=100) (potassium started at start of second day of life)	Group-B (n=100) (potassium started at end of third day of life)
04 Days	99 (99%)	93 (93%)
05 Days	01 (1%)	07 (7%)

## DISCUSSION

In our country many newborn babies are received in nursery. We admit them to observe for complications and treatment of underlying problem. There are many complications of birth asphyxia and one of them is abdominal distention. Abdominal distention may be due to low serum potassium, necrotizing entero-colitis and many others. Low serum potassium is commonly seen electrolyte imbalance which can be treated easily by adding potassium in intravenous fluid in admitted newborns.

If the underlying problem of the newborn has been treated properly then baby should take oral feeding and should be discharged home, but sometimes we observe that due to hypokalemia there is mild abdominal distention after starting feed.

In this study we observed that early addition of potassium in intravenous fluid may decrease the chances of abdominal distention due to low serum potassium level which is usually seen on third day of life.

Negreanu and Mostafa and colleagues in 2008 and 2010 explained that abdominal distention and ileus may be related to neuromuscular motility system or pacemaker cells of cajal in the intestine<sup>9,10</sup>.

In our study, we observed that there was no mechanical obstruction of intestine but there was mild abdominal distention in few newborns, which delayed the oral feeding and prolonged the stay in the hospital. Electrolyte imbalance especially potassium may cause ileus and may take few hours to settle even after correction of electrolytes.

Darrow and Hoffman studied that intestinal ileus can occur not only with hypokalemia but also with normal potassium levels. It may be consistent with total body potassium level rather serum potassium level<sup>11,12,13</sup>.

In our study, we observed that mild abdominal distention was also observed in newborns with normal serum potassium levels.

If we add electrolytes in second day of intravenous fluid, it may fulfill the deficiency of electrolytes in the whole body. In turn it may normalize the functions of the gut. Normal functioning of gut may help the baby to tolerate oral feed.

## CONCLUSIONS

Early addition of potassium in intravenous fluid of premature babies may decrease the chances of abdominal distention and may help in starting milk in early days of life. It may decrease the number of days of admission of newborn babies in nursery.

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