

# HEALTHCAST



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# PRETERM PRELABOUR RUPTURE OF MEMBRANES (PPROM)

Rupture of membranes spontaneously before the onset of contractions before 37 weeks is called PPRM. This is the commonest cause of preterm labour. It generally occurs in about 3 to 10% of all pregnancies. PPRM (before 27 weeks) accounts for at least 0.5% of all preterm births and results in significant neonatal morbidity and mortality, primarily from prematurity, sepsis, cord prolapse and pulmonary hypoplasia. In addition, there are risks associated with chorioamnionitis and placental abruption.

## Causes for premature rupture of membranes

The median latency after PPRM is 7 days and tends to shorten as the gestational age as PPRM advances. While its pathogenesis is not completely understood, infection, inflammation, bleeding, physical stress have been found as key contributors to the cause.

Additionally, several other risk factors that lead to PPRM such as –

1. Genital tract infections
2. Previous occurrence of PPRM
3. Antepartum bleeding and smoking

Chorioamnionitis, Placental abruption, Cord prolapse, Fetal death, Caesarean birth, Retained placenta, Postpartum endometritis, Neonatal death, Pulmonary hypoplasia of the newborn and



## Dr. Kavitha Kovi

Sr. Consultant - Obstetrics & Gynaecology

skeletal abnormalities of the fetus etc. are also some of the complications of complications of PPRM.

## Diagnosis and Management

While digital examination of the condition is to be avoided, local examination with the use of speculum shows pooling of liquor along with a high vaginal swab at the same time will avoid multiple examinations and help prevent infections. With the advent of technology, today there are certain commercial tests that are available to determine the leaking in doubtful cases (sensitivity and specificity not very clear). In PPRM ultrasound may not be very useful in the diagnosis, other medical investigations such as CBC, CRP, Urine for C & S and High vaginal swab C & S have been proven effective.

Management of the condition differs from one

case scenario to another. Therefore, expectant management versus intervention, use of tocolysis, antibiotic prophylaxis, antenatal corticosteroids, neuroprotection, methods of testing for infection and when to deliver the patient are some of the dilemmas. Hence, to reduce the morbidity and mortality setting up protocols and following them is useful.

The most essential step in the management is counselling the patient. A perinatal team consisting of the primary care obstetrician, neonatologist, fetal medicine expert and nursing team from the labour ward and NICU should discuss the course of the treatment that benefits the patient. Realistic discussion with the patient and family is very important.

**When and how to deliver the patient? Expectant vs Intervention. Let's divide it by weeks for better understanding.**

34 to 36+6 weeks – Antibiotics as per hospital policy, steroids (rule out infection) and mode of delivery by obstetric standards.

<34 to 26 weeks – Antibiotic prophylaxis is important and the optimal regimen is not very clear. Protocolizing the antibiotics as a policy helps in prompt care and avoids confusion among the junior staff or assistant caregivers. Inj ampicillin 2gms IV every 6th hourly for 48 hours followed by Erythromycin 250mg orally 6th hourly for 5 to 7 days is universally followed. Amoxicillin 500mg orally 8th hourly can be used instead of erythromycin. Azithromycin 1 gm stat orally on admission helps with Ureaplasma and chlamydia. For women with penicillin allergy, Azithromycin 1 gm oral stat dose plus inj Cefazolin 1gm IV 8th hourly for 48 hours followed by Oral cephalexin 500mg 6th hourly for 5 to 7 days is the recommendation.

Steroids (rule out infection), neuroprotection (inj magnesium sulphate 4gm IV loading dose diluted in NS and administered slowly over a period of 20 minutes followed by 1gm/hr for the next 24-hours). In early preterm, when there is no infection or any contraindications from the maternal side, expectant management helps in a significant reduction in age-related morbidity for the fetus. Fetal monitoring during expectant management can be based on individual cases depending on risk factors. The mode of delivery again depends on obstetric standards.

<26 to 23 weeks - Counselling the patient and family along with the perinatal team helps in management decisions. During this time, forming realistic goals and discussing in detail the treatment plan is essential for a good outcome. Antibiotics, neuroprotection and steroids are recommended and expectant management should always be the plan. Home care versus hospital care should be discussed with the family. Fetal monitoring in case of expectant management with home care should be discussed with the patient. If the delivery of the fetus is inevitable, the mode of delivery is made on an individual case basis though most of the time it is preferable for caesarean section. Sometimes resealing and re-accumulation of fluid is seen in certain patients. In special circumstances where the cerclage is insitu, it can be left in its place if there is no infection.

Following appropriate protocols in the management and a well-equipped tertiary care NICU is essential to minimize the morbidity and mortality in cases of PPRM.



## SURVIVAL OF THE TINIEST BABY

In a rare case, Mrs. Pooja (name changed) mother and a covid-19 survivor had developed a sudden pain abdomen during her pregnancy and was immediately rushed into labour.

She was hurried to the hospital, with a risk of premature delivery and without wasting any time the OBG team and the neonatal team was ready to meet the challenge. Rescue dose, steroids and Magnesium sulfate were administered to the patient and she started progressing. With the fetus in breech, the baby was then delivered with assisted normal vaginal delivery. Pooja and her family were blessed with a baby girl that was extremely prematurely born at 3 and a half months (25weeks+1day) before the expected date. Weighing only 720gm, the baby was unable to breathe on its own immediately at birth. The Neonatal team immediately started resuscitating the baby and with spontaneous breathing efforts, the baby's heart rate started picking up and she was eventually put on respiratory support. Post which she was then put on the state-of-art incubator Giraffe and was shifted to NICU for further care.

During the entire duration of the treatment, we provided the mother and the child with all the necessary forms of treatment and procedures such as - in the Golden hour of life initiated, securing central lines, starting antibiotics, surfactant, parenteral nutrition, continuing warm care and respiratory support etc.



**Dr. LATHIESH KUMAR  
KAMBHAM**

Lead Neonatology, Consultant –  
Paediatrics and Neonatology



**Dr. SAMPAT KUMAR  
SHETTIGAR**

Neonatologist & Paediatrician



**Dr. PUPUN PATNAYAK**  
Neonatologist &  
Paediatrician

However, the actual challenge started once the baby was shifted to the NICU as replacing the warmth of a mother's womb in an artificial set-up is an immense task as it is a very complicated process and requires years of expertise, precision and knowledge.

In the NICU, the incubator took care of the warmth required to maintain normal BMR and humidity which prevented the insensible water loss, and the closed chamber prevented the other forms of heat loss. The ventilator took care of the breathing initially, and with this tiny being's will to survive, we were able to wean off the non-invasive respiratory support within 24 hrs of life.

What needs to be kept in mind is to optimise oxygenation in such preterm babies, under or over use of oxygen or respiratory support can both be harmful to the baby and can lead to IVH, ROP, BPD etc.

Extreme preterm babies can be very challenging nutritionally. Each and every volume of feed, calories, micronutrients, vitamins, electrolytes has to be calculated cautiously upto fractions of decimals to meet the adequate requirements of such a tiny body. Therefore, the baby was also started on caffeine as premature babies have an immature respiratory centre and was later started on parenteral nutrition as adequate calories, proteins, fats and carbohydrates helps in achieving that body mass, and develop that innate immunity to adapt to the external environment.

Trophic feeds were started and increased as per protocol. Full feeds were reached on day 12 of life. Baby was started on human milk fortifier and other micronutrients and vitamins necessary for all round development of the brain and other organs.

She was also administered antibiotics as premature labour can be a sign of subtle infection in maternal genital tract, but judicious use, downgrading of antibiotics and stopping it was always our priority to prevent antibiotics resistance in our unit, and also subsequent side effects. Baby had a sterile blood culture and

antibiotics were stopped as per unit protocol. Strict hand hygiene policies were followed, cluster care done, and everything was targeted towards a developmentally supportive care.

Baby also received irradiated, Leuko-reduced PRBC, human milk fortifiers for additional protein and vitamin requirements, Multivitamins, Caffeine and so on.

### **Monitoring**

Baby's vitals were monitored continuously, daily assessment of weight gain or loss, abdominal girth, bowel movement, urine output, weekly head circumference, bone profile and haemoglobin, serum electrolytes, USG cranium, 2dECHO was done.

Nurses play a vital role in taking care of such preterm babies. They are the umbilical cords, providing feeds, medications in a sterile way. They also play a vital role in identifying sick newborn, taking care of the skin.

### **Discharge**

Achieved birth weight on day 16 of birth, and now was following the growth rate that would have been if the pregnancy continued. Baby was slowly transitioned to oral feeds at 33-34 weeks of gestational age and was discharged at 35 weeks of corrected gestational age with weight of 1.8kgs.

She is currently on full feeds with adequate bowel and bladder habits with minimal respiratory support. Her USG cranium and 2D ECHO is normal with no retinopathy of prematurity. The baby is tolerating feeds, passing urine and stool adequately just like any other normal child.

### **Follow up**

Now baby is 5 months old and is on child developmental clinic. Development appropriate of age. Baby is doing extremely well for its birth gestation and weight.



# CONSERVATIVE MANAGEMENT OF POSTPARTUM HAEMORRHAGE: BAKRI BALLOON

Pregnancy is the most beautiful phase of a woman's life. While the journey can be tumultuous with the rush of mixed feeling and change of hormones, one must exercise caution as any irregularity could be life threatening. Thousands of pregnant women in this world experience severe illness or death each year, largely from preventable or treatable causes.

Postpartum hemorrhage (PPH) is a major cause of maternal morbidity and mortality in both developing and developed countries. A life-threatening complication of delivery, postpartum hemorrhage warrants proper attention and care. Bakri Balloon is one such technology that can temporarily halt and reduce postpartum hemorrhage or give time for transfer to referral center.

About one in 100 to five in 100 women have postpartum hemorrhage and it is a globally leading cause of maternal morbidity and mortality. In other words, the incidences of postpartum haemorrhage are 1-5 percent only. It most often happens after the placenta is delivered, but it can also happen later. Most deaths resulting from PPH occur during the first 24 hours after birth, however, the majority of these can be prevented by timely and appropriate management.



**Dr. Sandhya Rani**

Sr. Consultant - Obstetrics & Gynaecology

While there are several ways to treat this condition including medication, manual massage which may help to stimulate uterine contractions, removal of placental pieces that remain in the uterus but among all other methods the Bakri balloon remains a successful method for postpartum hemorrhage management.

Bakri balloon is used for the temporary control and reduction of postpartum hemorrhage. This device is a dual channel balloon catheter specifically designed for intrauterine placement in cases of PPH. It is made of 100% silicone and contains no latex; therefore it can be safely used in patients of PPH. The timesaving catheter is easy to place, monitor and rapidly achieves tamponade within the uterine cavity.

In a recent case of a 34 year old Mrs Sreeya, the Bakri Balloon technique not only played a crucial

role in saving the patient's life but resulted in effective and timely management of PPH. Sreeya had been married for 6 years and had conceived with IVF for the first time. At 6 weeks of her pregnancy, she was diagnosed to have Dichorionic Diamniotic ((DCDA) twin pregnancy, a condition in which both the babies are growing in separate sacs and was counselled about the precautions needed and possible complications of twin pregnancy.

At 33 weeks, Sreeya reported to the hospital with lower abdominal discomfort for 2 hours. While her vitals were normal, her uterus was contracting, 3 in 10 minutes lasting for 40 seconds indicating that the patient was undergoing PPH. Per vaginal examination revealed her cervix to be fully effaced, 8 cms dilated and presenting part was below level of spines at +1 station. In view of advanced labour, the couple were counselled about a trial for vaginal delivery in OT (Double set up).

At full dilatation, we performed an ARM or amniotomy and delivered Sreeya's first twin of 1.8kg. We then infused 5 units of oxytocin injection and it was during her per vaginal examination that the second twin showed up at +1 station. We then performed another ARM and the second twin was delivered.

Placenta was expelled in sometime and extracted by traction through a countertraction method . 5 units oxytocin injection given i.v . uterus was well contracted. First degree perineal tear sutured.

After 5 minutes, her uterus started relaxing and a huge bout of bleeding was noted. As per the PPH protocol, we started the uterine massage and called for an anaesthetist. Sreeya's blood samples were sent for cross matching and over the next 30 mts, 20 units oxytocin infusion , 2 doses of injection ergometrin 0.2mg i.v , 2 doses of injection Carboprost 250 mcg i.m and 600mcg of

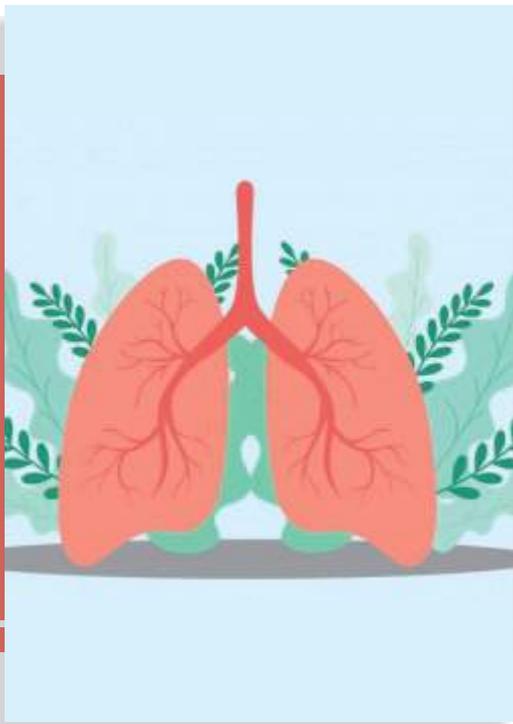
misoprostol sublingual were given to her under GA.

On further exploration of her cervix, we found no tears and her USG showed no retained placental bits. A gentle curettage was done while her uterus was still relaxing intermittently. During the surgery, Sreeya's estimated blood loss was 1000ml. Tachycardia and hypotension were managed with volume expanders.

In order to avoid surgical intervention, decision for Balloon tamponade was taken. Bakri balloon was placed in uterine cavity and inflated with 200ml os saline that helped in significantly reducing the bleeding to about 75 ml in next 30 minutes.

2 units of compatible PRBC were transfused later that helped in restoring her vitals. Antibiotic coverage was given as per hospital protocol. Bakri balloon was then removed after 24 hours and patient discharged after 48 hours.

In this way, anticipation of PPH, delivery in the OT, prompt intervention for PPH and use of Bakri balloon helped us avoid surgery and manage Atonic PPH conservatively.



# A RARE CASE OF THIAMINE RESPONSIVE ACUTE PULMONARY HYPERTENSION

Clinical history forms the major part of our medical education system, and rightly so as the majority of diagnosis can be made with a detailed history. Any good physician thrives on history for investigating and treating a case. One such vital aspect of history is the diet, demography, and socio-economic history, which we tend to overlook. The case of Baby Kushal, a 2-month-old boy, consolidates as to why this aspect of history taking is so vital.

Baby Kushal was born to Amrutha (Name Changed) in a small village of Andhra Pradesh and was suffering from fast and noisy breathing. As the condition of the child started worsening, his parents visited a nearby pediatrician and the baby was immediately started on Oxygen therapy. However, his respiratory distress was getting worse by the hour. With limited resources in hand, the baby was worked up to look out for a cause. While the child's X-ray seemed normal, his blood were suggestive of raised inflammatory markers. 2D ECHO was done, and parents had the shock of their life as the baby was said to have heart failure. Arrangements were made to transfer the baby and with deteriorating respiratory distress and heart failure, the baby was shifted to Aster Women and Children hospital with help of an experienced and well-equipped transport team. We immediately put Baby Kushal on respiratory support, repeat ECHO at Aster Women and Children hospital revealed signs of severe pulmonary arterial hypertension, along with signs of RV dysfunction.

## What went wrong with the baby?

In south India particularly in Andhra Pradesh, Karnataka, mothers are thiamine deficient. This is particularly seen in many districts of Andhra Pradesh and those of Kolar in Karnataka are particularly affected. With the advent of excessive milling, washing, and processing of cereals and pulses the outermost rich layer containing thiamine is lost. Also because of several native rituals, there is a restriction of diet in post-delivery of mothers due to social taboo. This adds to the problem of decreased thiamine intake in mothers in these areas.



**Dr. SRINIVASA MURTHY C L**  
Lead Paediatrics, Consultant –  
Paediatrics and Neonatology



**Dr. SUNIL KUMAR G**  
Neonatologist & Paediatrician



**Dr. LEENATHA REDDY N**  
Neonatologist & Paediatrician

Thiamine is a vitamin that helps in the process of generation of nitric oxide which in turn helps in regulating blood flow to the lungs. It is secreted in breast milk and is the only source for the baby. Therefore, diet, geography, and socio-economic history give us clues as to what could have triggered this acute onset of cardiac failure.

Human blood circulation is a series circulation, any obstruction in the path leads to an increase in pressure proximally. Baby Kushal was put on measures to increase blood flow to lungs such as high-frequency ventilation, inhaled nitric oxide, inotropes, etc. but nothing worked like inj Thiamine(100mg/kg/day IV injections), pressure on the heart decreased and heart failure gradually resolved. Dramatic response in clinical conditions was seen within 24hrs after its administration, and that in turn was diagnostic of thiamine deficiency. He was extubated, and taken off inotropes, on the 2nd day after commencing Thiamine supplementation.

### **What is pulmonary hypertension?**

Persistent pulmonary hypertension of the newborn (PPHN) is a dangerous condition that may result in a baby not getting enough oxygen after birth. During pregnancy, a baby gets all of the oxygen he or she needs from the mother, through the placenta. The child's blood mostly skips over its own lungs and the blood vessels going to the baby's lungs (pulmonary vessels) are closed. When the baby is born and takes the first breath, the pulmonary vessels should open up and start flowing blood through the lungs. This allows the baby to get oxygen for the brain and the rest of the body.

With PPHN, the blood vessels to the baby's lungs do not open up fully. The closed blood vessels cause too much blood to skip the lungs. This means that the brain and the body may not get enough oxygen and there is too much pressure in the blood vessels to the lungs (pulmonary hypertension). This high pressure can hurt the baby's heart and lungs.

Persistent pulmonary hypertension of the newborn (PPHN) presents in the neonatal period with an incidence of 2 per 1000 live births.

Early infancy has traditionally been an uncommon age for presentation with new-onset of Pulmonary Hypertension. However, recently, several cases of severe PH due to thiamine deficiency were reported during early infancy from India.

### **Infantile Pulmonary Hypertension**

Pediatric pulmonary hypertension (PH) is most commonly associated with cardiac and pulmonary diseases. Among less common causes, various hematologic, hepatic, metabolic, oncologic, genetic, and rheumatologic disorders are described in the literature.

### **Thiamine deficiency as a cause of Pulmonary Hypertension**

The presentation of Infantile PH in the setting of vitamin deficiencies is exceedingly rare, though associations with deficiencies in vitamin D, thiamine, and vitamin C are reported. Congestive cardiac failure in infants from thiamine deficiency is well documented in some specific geographic locations. In acute wet beriberi or Shoshin beriberi, rapid deterioration in cardiac function leads to hypotension, pulmonary edema, cardiomegaly, and high lactate levels. However, in the past, PH was not reported in these infants.

### **Why Thiamine deficiency?**

Thiamine deficiency historically was seen in refugee populations and geographical areas where rice was the staple diet. Industrialization in developed countries has led to food fortification reducing micronutrient deficiencies. The widespread availability of polished rice in developing countries has resulted in thiamine deficiency. Consumption of polished rice, postpartum food restriction, thiaminase-containing foods such as tea, coffee, or betel nut precipitate can increase thiamine deficiency. Furthermore, thiamine is very low in breast milk of thiamine-deficient mothers putting exclusively breastfeeding infants at high risk.

Thiamine administration produced dramatic recovery in these previously healthy, exclusively breastfeeding infants presenting with acute cardiac failure and severe pulmonary hypertension (PH).

### **How do babies end up deficient?**

Thiamine deficiency can occur in exclusively breastfeeding infants. Consumption of staples with low thiamine content and postpartum food restrictions by mothers may be causative. This leads to multiple issues, including acute right heart failure with a high infant mortality rate around the third month of life.

### **Conclusion**

Thiamine Responsive Acute Pulmonary Hypertension (TRAPH) presents as an acute onset of respiratory distress, vomiting, and aphonia in a previously well exclusively breastfeeding infant. Examination shows tachycardia, tachypnoea, and hepatomegaly. Echocardiography shows severe PH. Administration of thiamine leads to rapid improvement within 48 hours. Delayed treatment can be fatal. Diet and cultural practices are contributing factors. It is vital that we consider TRAPH as a differential diagnosis in such cases, to recognize this easily treatable but fatal disease.



# EXTREME PRETERM

Birth that occurs any time prior to 37 weeks of pregnancy is considered premature. The earlier the premature birth, the higher the risk for a premature baby. Premature babies are mostly underweight and may need prolonged intensive support, breathing support. Prematurity also increases the risk of medical complications and long-term developmental problems. The most extreme issues occur in babies born at less than 28 weeks. They often weigh less than 1000gm at birth. The critical organs – such as the heart, lungs, digestive organs, and brain – may not be developed enough to keep the baby alive without intensive medical care.

## **Problem:**

Approximately 15 million babies are born too early every year. Approximately 1 million children die each year due to complications of preterm birth. Many survivors face a lifetime of disability, including learning disabilities and visual and hearing problems. Prematurity is globally the leading cause of death in children under the age of 5 years. The 10 countries with the greatest number of preterm birth are India: 3 519 100, China: 1 172 300, Nigeria: 773 600, Pakistan: 748 100, Indonesia: 675 700, United States of America: 517 400, Bangladesh: 424 100, Philippines: 348 900, Democratic Republic of the Congo: 341 400 and Brazil: 279 300. Where India stands first in highest no of premature births.



**Dr. SRINIVASA MURTHY C L**

Lead Paediatrics, Consultant –  
Paediatrics and Neonatology



**Dr. LATHIESH KUMAR  
KAMBHAM**

Lead Neonatology, Consultant –  
Paediatrics and Neonatology



**Dr. SAMPAT KUMAR  
SHETTIGAR**

Neonatologist & Paediatrician

## **Solution**

More than 75% of premature babies can be saved with feasible, cost-effective and essential care during childbirth and postnatal period. There must be provisions of antibiotics to treat newborn infections, antenatal steroid injections given to pregnant women at risk of preterm labor, and under set criteria to strengthen the babies' lungs. Kangaroo mother care must be brought into practice where the baby is carried by the mother with skin-to-skin contact and frequent breastfeeding.

## **Preventing deaths and complications from preterm birth starts with a healthy pregnancy**

Quality care before, between, and during pregnancies will ensure all women have a positive pregnancy experience. Fetal measurements and the use of ultrasound helps in determining gestational age and detecting multiple pregnancies. One must have a minimum of 8 contacts with health professionals throughout pregnancy to identify and manage other risk factors, such as infections. Better access to contraceptives and increased empowerment could also help reduce preterm births.

## **What Causes Extreme Prematurity?**

Most preterm births happen spontaneously, but some are due to early induction of labor or cesarean birth, whether for medical or non-medical reasons. The specific cause of extreme prematurity can't be identified. Known factors that can increase the risk of premature birth are Previous preterm labor or birth, Maternal infection, Multiple pregnancies, having an abnormal cervix or uterus, being younger than 20 or older than 35, Chronic heart disease or Kidney disease and Smoking etc. The conditions such as Infections, High blood pressure, Diabetes, Blood clotting problems, Problems with the placenta, Vaginal bleeding, A short time between pregnancies have been found to increase the likelihood of premature birth.

Problems in an extremely premature infant are Sepsis, Respiratory distress syndrome, Intraventricular hemorrhage, Retinopathy of

prematurity, Patent ductus arteriosus, Necrotising enterocolitis, Abnormal serum electrolytes/Hypoglycemia, Anaemia of prematurity, Broncho pulmonary dysplasia and Neonatal cholestasis etc.

## **How to treat preterm?**

Any approach should be targeted to achieve the near same physiology that the baby would have received if in the mother's womb. The humidity, warmth can be achieved by the incubator. Immature lungs will need early CPAP, and surfactant administration is needed if the baby is in respiratory distress. There must be judicious use of iv fluids, avoid rapid administration and overloading. Adequate electrolytes with necessary GIR is needed to maintain euglycaemia.

Early initiation of parenteral nutrition along with oral painting of colostrum, and making sure baby is receiving adequate calories, carbohydrates and fats with essential micronutrients/ vitamins. Strict asepsis and hand hygiene protocol in unit is must to provide a sterile environment for baby to grow, also good antibiotic coverage for probable sepsis. Cluster care and minimal handling of preterm babies must be followed. The staff should be trained in identifying subtle signs of sick preterm babies and provide immediate action.



# PELVIC STABILIZATION EXERCISE IN PREGNANCY AND POSTPARTUM

Pregnancy and childbirth cause various changes to women's body. Hormones like oestrogen, progesterone and relaxin causes relaxation of the muscles and ligaments. The lax tissues and hyper mobile spinal segments change the bone alignment around the pelvis significantly and makes women vulnerable to pain.

Core stability was introduced for the first time in 1990s by Hodges and Richardson. Core muscles play a major role in maintaining the posture and stability. When these muscles are unable to maintain optimum posture of the spine and pelvic girdle, it causes Lumbo pelvic Instability. This is one of the major causes for Postpartum lumbar or low back pain. Studies show that 70% women have postpartum low back pain, out of which 10% of these women suffer with it for years together.

Since the deep muscles in the lumbar and pelvic region is responsible for pelvic stabilization, strengthening these muscles will restore the function and ease pain. Stabilization exercises causes specific activation of the local and the global muscle groups, specifically focusing on control of lumbopelvic region and coordinated muscle recruitment.

The core is described as a muscle box with the abdominals in the front, paraspinalis and gluteus in the back, the diaphragm at the top and pelvic floor with hip girdle muscles at the bottom. These muscles form a muscular cylinder and supports the spine and the pelvis. They work together as a unit to ensure and maintain trunk stability. Furthermore, the core can be described with 3 subsystems: The passive system which involves the spinal ligaments that provides stability in the end range of motion. The active system which consists of deep and superficial muscles that provides stability at rest and during movement and the Neural control system which is essential for coordinating muscle activity, so that the correct group of muscles are activated at correct time and intensity. Impairment of any one of these subsystems can lead to various dysfunctions.

Diastasis Rectus Abdominis (DRA) is a midline inter-recti separation which effects woman both in pregnancy and postpartum. Mechanical and hormonal stresses placed on the abdominal wall by the growing fetus and displaced abdominal



**Ms. Tejaswi G**  
Physiotherapist

organs lead to elastic changes of the connective tissues and causes DRA. Researches show that DRA and pelvic floor muscle weakness is connected. Around 66% of women with DRA had issues of stress urinary incontinence, fecal incontinence and pelvic organ prolapse. They also suffered with higher degree of pain in the abdominal and pelvic region in the postpartum period. Back pain is also caused by the changes in the chest wall expansion during pregnancy.

According to the ACOG guidelines issued in the year 2002, 30 minutes of exercises is recommended daily during pregnancy and in the postpartum period. Exercising during pregnancy surely has many proved benefits, most importantly it reduces pain in the low back and pelvic girdle. The occurrence of postpartum pelvic instability is proved to be reduced when women engage in antenatal strength conditioning. When pelvic stability exercises are performed in the postpartum period, it has resulted in reduction of morning stiffness and pain intensity in the low back. It has shown to improve the quality of sleep and overall wellbeing. It leads to better core strength and improved muscle recruitment. Stability exercises also improves the strength of pelvic floor thereby improving the incontinence. Pelvic floor muscles play a very important role in sexual function; these exercises have proven to reduce pelvic pain during sexual intercourse. Stability exercises is proved to be an effective way of treating diastasis recti. Thus, pelvic stabilization exercises are highly recommended to all women with uncomplicated pregnancy, both during antenatal and the postpartum period with prior clinical evaluation.



## PRELIMINARY DIABETES MANAGEMENT FOR PREGESTATIONAL AND GESTATIONAL DIABETES WITH MEDICAL NUTRITION THERAPY (MNT)

With an increased prevalence of diabetes in the urban population, there is also an increase in the cases of gestational diabetes mellitus (GDM). GDM is a type of diabetes that is diagnosed exclusively during pregnancy. GDM occurs due to compromised beta cell activity or any preexisting insulin resistance. Numerous studies have reported that an increased risk of GDM is seen among women who are overweight or obese compared with lean or normal-weight women. A strong family history of diabetes increased maternal age and excessive weight gain during pregnancy are some of the contributing factors linked to gestational diabetes.

Untreated GDM is associated with short and long-term complications. Macrosomia (large baby) is common in GDM women who are not treated and it affects around 15–45% of newborns. Women with GDM are also at risk to develop pre-eclampsia. An increased glucose level in GDM mothers may predispose them to early labor and delivery. In addition to that, it is seen that about 50% of women with GDM develop type 2 diabetes within 5 years of pregnancy. A child born to women with GDM are at an eightfold increased risk of developing type 2 diabetes in their early childhood or adolescence.

Testing for GDM is recommended twice during the Antenatal period. The first testing can be done during the first antenatal visit or soon after



**Ms. ARCHANA S**

Clinical Nutritionist & Dietitian

conception. The second testing can be done during 24–28 weeks of pregnancy, if the first test is negative. Most clinicians use a one-step approach called glucose tolerance test (GTT) where 75 mg of glucose is administered orally and the blood glucose levels are monitored. Fasting glucose levels should be less than or equal to 95 mg per dL, one-hour postprandial levels less than or equal to 180 mg/dL, and two-hour postprandial levels less than or equal to 153 mg/dl. Limited data support the use of HbA1c as a screening test for GDM. HbA1c test can be a useful tool to reduce the number of OGTT but it cannot be a substitute test to confirm the diagnosis of GDM.

Initial treatment for mild to moderate GDM cases involves diet modification, glucose monitoring, and moderate exercise. When dietary management does not achieve desired glucose control, insulin or oral antidiabetic medications may be used.

Medical nutrition therapy plays an important role

in the management of gestational diabetes and has an impact on women and the newborn. The nutritional requirement of a woman with GDM is similar to that of a healthy pregnant woman, but special attention is paid to carbohydrates. Currently, the American Diabetes Association recommends at least 175 g/d of carbohydrate intake during pregnancy. Complete elimination or low carbohydrate diet in periconceptional period or during pregnancy is a wrong interpretation to attain pregnancy goals. Such dietary practices are unsafe to support both maternal needs and optimal fetal growth.

Extreme restriction of maternal carbohydrate intake can affect placental glucose transfer and also increase the risk of ketosis. In the absence of carbohydrates, the body utilizes body fat, as the major source of energy, producing acids called ketones or ketone bodies. Without timely detection or control, one can develop diabetic ketoacidosis resulting in serious abnormalities affecting both maternal and newborn health.

Apart from carbohydrate counting, the type and quality of carbohydrates is important factor to consider while planning a diet for a diabetic mother. Not all carbohydrates have the same glycemic potential and its action on blood sugar varies based on Glycemic Index and load. According to the American Diabetic Association, the Glycemic index is a ranking system that indicates how quickly a carbohydrate-rich food raises blood glucose levels. Food ranked <55 is considered to have a low GI eg: non-starchy vegetables, legumes, whole grains and dairy. Food with a ranking between 56 –75 is considered as moderate GI and a ranking between 76 – 100 as High GI food that includes all processed or refined items such as cornflakes, white rice, refined flour.

The GI is a way of ranking carbohydrate food according to the speed at which they cause a raise or dip in the blood glucose levels. However, the overall effect on the blood glucose level depends on the Glycemic Index and the amount of carbohydrates (grams) present in the food, called

the Glycemic Load. Glycemic load (GL) would be considered high with  $GL > 20$ , intermediate with  $GL 11$  to  $19$  and Low  $GL < 10$ . Certain food with a high glycemic index may have a low glycemic load, which makes food safe to be consumed during GDM but with portion control. For example, 100 g of watermelon has a Glycemic index of 72(High GI) but a Glycemic Load of 5 (Low GL). Thereby, watermelon would have an overall lower impact on blood sugar levels.

A healthy balanced diet for a GDM case has to be customized considering an optimal mixture of carbohydrate counting, and good quality carbohydrates (lower GI and lower GL), along with the moderate level of physical activity. This pattern of approach may help reduce the need for pharmacological intervention to improve hyperglycemia in women with Gestational Diabetes.



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Plot No. 2, Sadaramangala Industrial Area, Off. Whitefield Main Road, Opposite ITPL, Whitefield,  
Bengaluru, Karnataka- 560066. T: 080-45108888

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