Antepartum Non-Stress Test (NST)

Site Applicability

St. Paul's Hospital, Maternity Centre

Practice Level

Specialized:

- Perinatal Registered Nurses
- Registered Midwives
- Physicians (Obstetricians, Family Practice with Maternity Centre privileges)
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Requirements

All providers of peripartum obstetrical care (Physicians, Midwives, Nurses) commit to formal education in fetal health surveillance (FHS) and maintain up to date competence with formal review of FHS principles every 2 years.

Need to Know

An antenatal non-stress test (NST) is a screening tool used to assess fetal wellbeing when conditions which may increase the risk for adverse perinatal outcomes are identified in pregnancy.

- NSTs may be done in the Fetal Monitoring Clinic (pre-booked), in the Maternity Centre Assessment Room (drop-in), or in Inpatient Rooms (on-going management of care)

The decision to initiate antenatal fetal testing should be individualized and reflect the risk factor(s) associated with an individual pregnancy.

An atypical or abnormal classification of an NST indicates the need for further investigation and/or the delivery of the fetus in order to minimize potential harmful outcomes.

In most cases a normal NST is predictive of good perinatal outcome for one week (providing the maternal-fetal condition remains stable), except in women with insulin dependent diabetes or with a postdates pregnancy, in which case NSTs are recommended at least twice weekly

Equipment and Supplies

- Electronic Fetal monitor (EFM) with appropriate attachments
- EFM paper (for Code Grey/Downtime and off-service NSTs)
- BP machine
- Glucometer (if needed)
- Single patient use measuring tape
- Urine dip stick and interpretation guide (if needed)

Guideline

Assessment

The maternal obstetrical history, severity of maternal and fetal disorders in the current pregnancy, the gestational age at onset, and perceived risk of fetal asphyxia are taken into account when determining the appropriate time to initiate antenatal fetal testing and its ongoing frequency.

- Initiation of antenatal fetal assessment should reflect the clinical suspicion of increased risk once the fetus has reached viability
- Testing is usually performed once or twice weekly
- Daily testing may be required to aid in the timing of delivery to maximize gestational age while avoiding significant intrauterine morbidity in the preterm fetus

Indications for NST:

Any condition where there is an associated increased risk of perinatal mortality or morbidity. The following table is a list of indications associated with increased perinatal morbidity and mortality where antenatal fetal health surveillance may be beneficial.

	Maternal Factors	Fetal Factors
Previous Pregnancy	Hypertensive disorders of pregnancy Placental abruption	Intrauterine growth restriction Stillbirth
Current Pregnancy	Abnormal maternal serum screening (e.g. low PAPPA, high AFP, high hCG) Advanced maternal age Alloimmunization Antepartum hemorrhage Cholestasis Chronic (stable) abruption Diabetes – pre-pregnancy and insulin requiring gestational diabetes Hypertensive disorders of pregnancy Maternal conditions (e.g. SLE, renal disease, etc.) Motor vehicle accident or trauma during pregnancy Placenta and/or cord anomalies (e.g. single umbilical artery, velamentous cord insertion, vasa previa, etc.) Post-dates or Post-term pregnancy Pre-pregnant BMI greater than or equal to 35 kg/m^2 Preterm premature rupture of membranes Substance use Surgical procedure in pregnancy	Decreased fetal movement (reduced or absent maternal perception thereof) Intrauterine growth restriction Multiple gestation Preterm labour Significant fetal anomaly compatible with life (e.g. gastroschisis) Suspected oligohydramnios or polyhydramnios

Classification of NST:

Parameter	NORMAL	ATYPICAL	ABNORMAL
Baseline	• 110 to 160 bpm	• 100 to 110 bpm • over160 bpm for less than 30 min • Rising baseline	• Bradycardia under 100 bpm • Tachycardia over 160 bpm for more than 30 min. • Erratic baseline
Variability	• Moderate (6 to 25 bpm) • Absent or Minimal (5 bpm or less) for less than 40 minutes	• Absent or Minimal for 40 to 80 min.	• Absent or Minimal for 80 min or more • Marked (25 bpm or more) for more than 10 min • Sinusoidal for 20 minutes or more
Accelerations	• 2 or more in less than 40 minutes of testing	• 2 or less in 40 to 80 minutes of testing	• 2 or less in more than 80 minutes of testing
Decelerations	• None or occasional variable less than 30 sec duration	• Variable decelerations of duration 30 to 60 seconds	• Variable decelerations lasting more than 60 seconds • Late deceleration(s)

Interventions

Notify Primary care provider (Physician, Midwife) and Charge Nurse when:

- Atypical/abnormal NST classification
- Cardio or toco channel is unsatisfactory for accurate interpretation despite efforts to improve data collection.
- Intrauterine resuscitation measures fail to resolve the atypical/abnormal pattern

Intrauterine Resuscitation:

Goals	Interventions
Improve • Maternal status • Uterine blood flow • Umbilical circulation • Placental perfusion • Fetal oxygenation	1. CALL FOR HELP 2. Change maternal position 3. Assess maternal vital signs 4. Administer IV fluids and/or oxygen by face mask (if appropriate) 5. Reduce maternal anxiety

Further clinical assessment is required when an NST has been classified as either Atypical or Abnormal. This may include:

- Ultrasound
  - This may be done at the bedside with portable ultrasound or in the Ultrasound department depending on the urgency of the situation
- Blood work
  - Specifics determined by clinical picture and plan of care
- Admission for continued observation and/or delivery, or transfer to higher level of care

Normal NSTs are reviewed and signed by the on-call OB within 24 hours.

Parameter	NORMAL	ATYPICAL	ABNORMAL
Report	**At earliest opportunity** • Notify Primary Care Provider (PCP) • Signed within 24 hours by OB on-call	**At time of classification** • Notify PCP • PCP or OB on-call to review within 1 hour	**Immediately** • Notify PCP • Consult OB on-call to review immediately and assess patient
Action	**FURTHER ASSESSMENT OPTIONAL** (based on total clinical picture)	**FURTHER ASSESSMENT REQUIRED**	**URGENT ACTION REQUIRED**
	• Identify and/or confirm plan for ongoing care • Book appointment as per criteria	• Continue NST until viewed by PCP and/or OB on-call and further assessment is planned • Repeat NST (if interrupted) • Establish plan of care for ongoing management	• **Initiate intrauterine resuscitation** • Further clinical assessment (i.e. U/S) • Plan for intensive observation and/or delivery based on clinical picture and gestational age

NST Steps

1. Review Antenatal Record and any relevant patient history documents/information
2. Complete maternal history – previous pregnancies, medical-surgical, family history, allergies, medications and/or herbal remedies, vitamins, etc.
3. Explain procedure to patient and review patient understanding of indication for monitoring
4. Complete physical assessment:
    - Inspect abdomen (size, shape, skin condition), measure SFH
    - Palpate abdomen using Leopold's maneuvers to identify fetal position, presence of fetal movements and/or contractions
    - Check maternal vital signs, perform urine dip, capillary blood glucose (as needed)
    - Assess for any clinically significant indicators (e.g. signs and symptoms of worsening gestational hypertension, etc.)
5. Initiate NST
    - Give patient FM count indicator and explain how to use
    - Minimum of 20 minutes is required.
    - Do not give juice or perform abdominal manipulation to elicit fetal movements
    - If inadequate accelerations and variability within the first 20 minutes, reposition, and continue monitoring.
6. Review completed NST with patient, and provide any other relevant antenatal education

Scheduling an Assessment

Fetal Monitoring Clinic (Booked)

- Outpatient NSTs are booked by calling the Fetal Monitoring Clinic, Monday to Friday 0800 to 1600 and/or by completed required forms/documentation/orders (electronic and/or paper)
- Outpatient NST requirements:
    - 26 weeks or more gestational age
    - Antenatal Records Parts 1 and 2
    - Ultrasound results
    - Any pertinent Lab results

Assessment Room (Drop-In)

- NSTs may be done as drop-in in the Assessment Room when indicated by the clinical situation (e.g. decreased fetal movement, antepartum bleeding, pre-term labour, etc.); otherwise, an appointment is made
- Any NST done through the Assessment Room must be reviewed by the primary care provider or delegate before the patient is discharged and plan for follow up identified

In-Patient Rooms (On-going management of care)

- NSTs may be included as part of a patient's on-going management to monitor fetal wellbeing while the patient is admitted to hospital. The patient does not need to be admitted in the Maternity Centre in order for monitoring to occur

- If monitoring in a location outside the Maternity Centre or during a Code Grey/Downtime, the Perinatal RN performing the NST should ensure that there is adequate EFM paper to print the NST, and that the NST is labelled with the appropriate patient identifiers
- NSTs performed on inpatients should be reviewed by the on-call OB team and/or PCP. In the event of an atypical or abnormal classification, the Perinatal RN should continue monitoring the patient and page the on-call OB team to come assess the patient

Documentation

All NSTs completed within the Maternity Centre must be finalized **in FetaLink**

Outpatient NST Documentation (Fetal Monitoring Clinic)

- CERNER PowerChart →
  - AD HOC → OB Ambulatory Assessment Form
  - Interactive View and I&O → Antenatal Testing Band → All applicable Sections and Fields
  - NOTES → Antenatal Testing Note with NST PDF sent to 'SPH OB Pool' for signature

Outpatient NST Documentation (Assessment Room)

- CERNER PowerChart →
  - AD HOC → OB Triage and Assessment Form
  - Interactive View and I&O → OB Triage Ban → All applicable Sections and Fields
    → OB Education Band → All applicable Sections and Fields
  - NOTES → Antenatal Testing Note with NST PDF sent to 'SPH OB Pool' and PCP for signature

Inpatient NST Documentation

- CERNER PowerChart →
  - Interactive View and I&O → Antepartum Band → All applicable Sections and Fields
    → OB Education Band → All applicable Sections and Fields
- For NSTs performed during Code Grey/Downtime or in off-service areas, NST paper must be affixed to Mounting Forms in order to be scanned into patient's chart

Patient and Family Education

- Provide patient with information about indication for NST and explain NST results.
- Review fetal movement counting – how and when to do. Provide written information.
- Provide support for patient and support person as required for interventions.
- Explain reason for interventions.
- Provide hospital contact information.

Related Documents

- B-00-07-10012 – Obstetrical Consultation, Indications for
- B-00-07-10048 – Fetal Health Surveillance (FHS): Intrapartum

References

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Choudhary PK, Bhati BS, Bishnoi S. (2020). Role of non stress test in monitoring antenatal fetal well being in high risk pregnancy. Indian J Obstet Gynecol Res, 7(2):193-198.

Delaney, M. Roggensack, A. (2017). No. 214 – Guidelines for management of pregnancy at 41+0 to 42+1 weeks. JOGC, 39 (8): E164-E174.

Jain V., et al. (2021). Guideline No. 421: Point of care ultrasound in obstetrics and gynaecology. JOGC: https://doi.org/10.1016/j.jogc.2021.07.003

Liston, R., et al. (2018) No. 197a – Fetal health surveillance: Antepartum consensus guideline. JOGC, 40 (4): E251-E271.

Maternal Infant Child Youth (MICY). (2020). Antepartum nonstress testing and ultrasound surveillance [CPO #05-394]. FHA.

Definitions

Accelerations are defined as an increase in the fetal heart rate above baseline where the peak has a defined minimum height and the duration of the acceleration (the time interval between onset and return to baseline) has a defined minimum which is determined by the gestational age of the fetus:

- Gestational age greater than or equal to 32 weeks = an increase from baseline of a minimum 15 bpm lasting a minimum of 15 seconds
- Gestational age less than 32 weeks = an increase of 10 bpm for a minimum of 10 sec

Decelerations are defined as a decreased in the fetal heart rate below baseline with the type of deceleration determined by the slope of the decrease (time from onset of decrease to the nadir/bottom), duration of the decrease below baseline, and coincidence with any uterine activity:

- Gradual – 30 seconds or longer from onset to nadir; no depth criterion
  - Early – onset, nadir, and return to baseline occurs with the start, peak, end of uterine activity
  - Late – onset, nadir, and return to baseline occurs after the start, peak, end of uterine activity
- Abrupt – less than 30 seconds from onset to nadir, minimum depth criterion determined by gestational age of fetus
  - Abrupt decelerations are called variable decelerations

- Gestational age greater than or equal to 32 weeks = a decrease from baseline of a minimum 15 bpm lasting a minimum of 15 seconds
- Gestational age less than 32 weeks = a decrease of 10 bpm for a minimum of 10 sec

Groups/Persons Consulted:

Program Director, Maternity PHC

Patient Care Manager, Maternity PHC

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