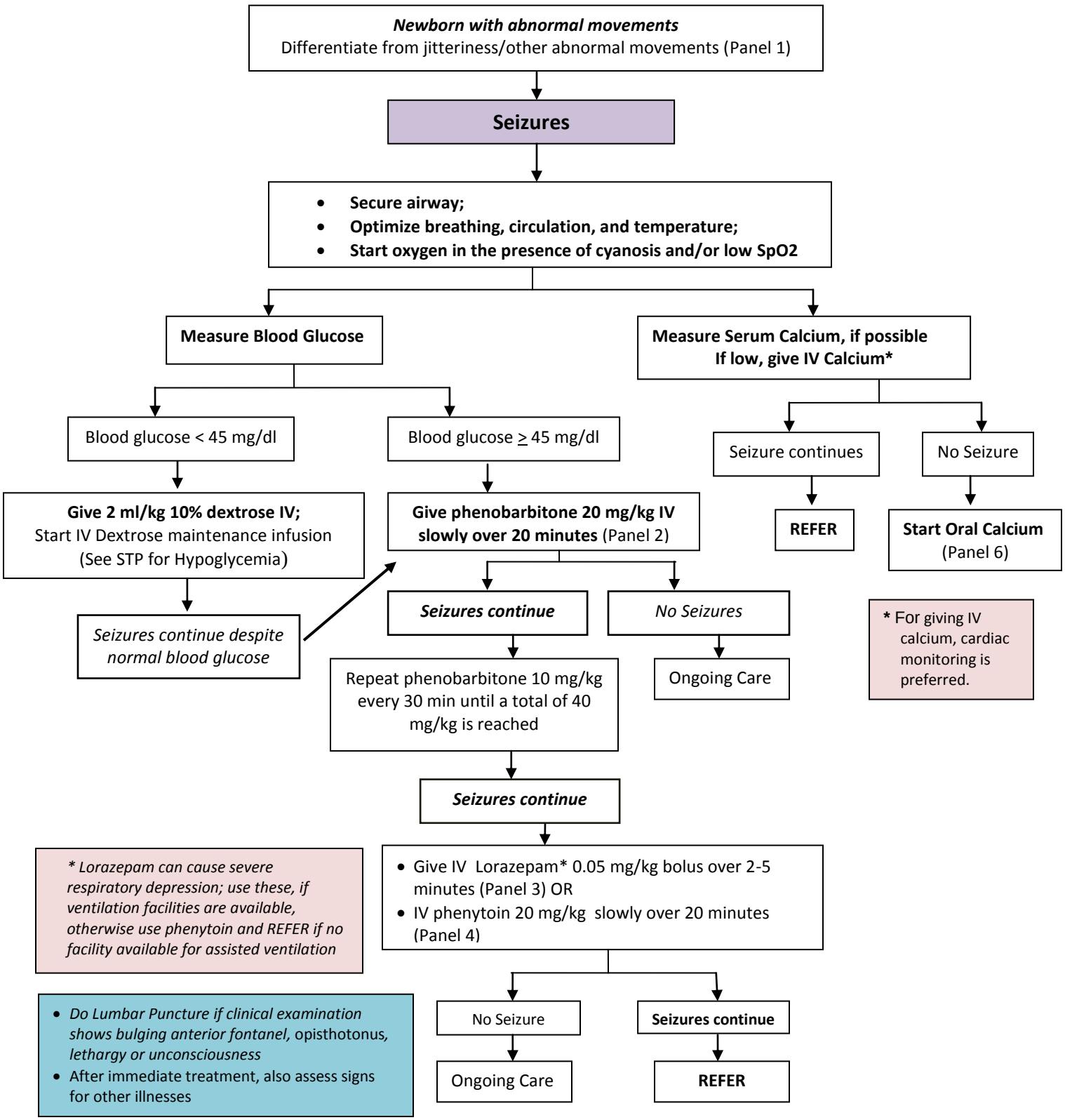
Management of a newborn with seizures

Flowchart 1: Initial management



Panel 1: Convulsions vs. Jitteriness

Convulsions	Jitteriness
Have both fast and slow components Slow movements (1-3 jerks per second)	Fast movements (4-6 per second); tremors are of equal amplitude
Not provoked by stimulation	Provoked by stimulation
Does not stop with restraint	Stops with restraint
Neurological examination - often abnormal	Neurological examination – usually normal
Often associated with eye movements (tonic deviation or fixed stare) and/or autonomic changes (changes in heart rate)	Not associated with eye movements or autonomic changes

Panel 2: Protocol for administering phenobarbitone	
Presentation	Injection 200 mg/ml; 1 ml ampoules
Dosage	Loading dose: 20 mg/kg IV or IM Maintenance: 5 mg/kg/day PO (once daily)
Route	Intravenous and per oral
Directions for use	Take 0.1 mL of solution and dilute with 0.9 mL of water for injection to make 1 mL Resultant concentration is 20 mg/mL Give required amount slowly over 15-20 minutes.
Caution	May cause respiratory arrest

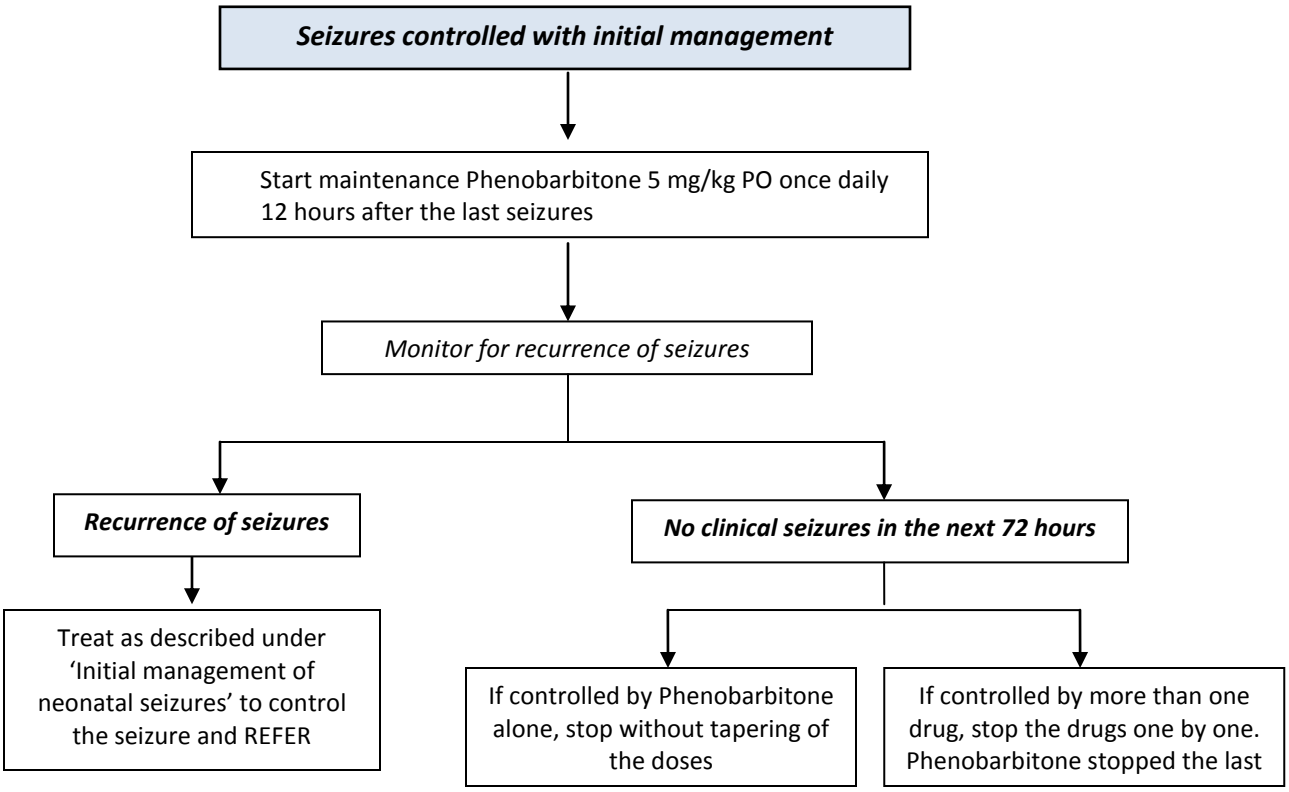
Panel 3: Protocol for administering lorazepam	
Presentation	Injection 2 mg/ml OR 4 mg/ml; 1 ml ampoules
Dosage	Loading dose: 0.05 mg/kg IV; May be repeated, if necessary.
Route	Intravenous route
Directions for use	Take 1.0 mL of solution and dilute with 9.0 mL of water for injection to make 10 mL Dilute again by adding 1.0 mL of the reconstituted solution to 9.0 mL of water for injection to make 10 mL Resultant concentration is 0.02 or 0.04 mg/mL (depending upon the original concentration in the ampoule) Give the required amount slowly over 2-5 minutes.
Caution	May cause respiratory arrest

Panel 4: Protocol for administering phenytoin	
Presentation	Injection 100 mg/2ml
Dosage	Loading dose: 15-20 mg/kg IV
Route	Intravenous route
Directions for use	Dilute in normal saline Give slowly at a rate 1 mg/kg/min infusion over 15-20 minutes
Caution	After giving, flush the cannula with saline to prevent phlebitis Do not use cloudy solutions

Panel 5: Protocol for administering IV calcium gluconate	
Presentation	9 mg/ml ampoules
Dosage	1-2 ml/kg/dose every 6-8 hourly
Directions for use	Dilute in equal amount of distilled water Inject very slowly while MONITORING HEART RATE If there is bradycardia, discontinue the injection.
Caution	Take care to avoid extravasation, if being given as infusion, as it may cause sloughing of skin

Panel 6: Protocol for administering oral calcium	
Presentation	Suspension containing elemental calcium and elemental phosphorus in ratio of 2 :1
Dosage	120 mg/Kg/day calcium and 60 mg/kg/day phosphorus; divided into 8 hourly doses
Caution	Ensure compliance

Flowchart 2: Ongoing care of newborn with seizures



Annexure 1: Differential diagnosis of neonatal seizures and spasms

Findings			Probable Diagnosis
History	**Examination**	**Investigations or Other Known Diagnoses**	
• Time of onset day 1 to 3 • **History of maternal diabetes** • **Poor or no feeding**	• Convulsions, jitteriness • Lethargy, or unconsciousness • Small baby (less than 2.5 kg at birth or born before 37 weeks gestation) • Large baby (more than 4 kg at birth)	Blood glucose less than 45 mg/dl (2.6 mmol/l)	**Hypoglycemia**
• Mother not immunized with tetanus toxoid • Poor feeding or no feeding after having fed well initially • Time of onset day 3 to 14 • **Unclean birth** • **Application of unclean or harmful substances (e.g. animal dung) to umbilicus**	Spasms	Infection of umbilicus	**Tetanus**
Time of onset day 2 or later	• Seizures • Lethargy or unconsciousness • Bulging anterior fontanelle	Sepsis	**Possible meningitis**
• **Complicated or difficult labour or birth (fetal distress)** • **Failure of baby to spontaneously breathe at birth** • **Resuscitation required at birth** • Time of onset within 24 hours of birth	• Convulsions or unconsciousness • Lethargy or unconsciousness • Breathing difficulty • Abnormal body temperature • Floppiness or reduced activity • Irritability		**Asphyxia or other brain injury**
• *Time of onset day 1 to 7* • *Sudden deterioration of condition* • *Sudden pallor*	• Convulsions or unconsciousness • Small baby (less than 2.5 kg at birth or born before 37 weeks gestation) • Severe breathing difficulty		**Intraventricular bleeding**
• Time of onset of encephalopathy day 3 to 7 • Serious jaundice • **Late or no treatment of serious jaundice**	• Convulsions • Opisthotonus • Poor or no feeding • Lethargy or floppiness	• Positive Coombs test • High Serum Bilirubin	**Bilirubin encephalopathy (kernicterus)**

The diagnosis cannot be made if a finding listed in bold is absent. The presence of a finding listed in bold, however, does not guarantee the diagnosis.