Indolent Respiratory Viral Infections in Young Infants

Suresh Kishanrao *

Family Physician & Public Health Consultant Bengaluru,India.

Corresponding Author: Suresh Kishanrao, Family Physician & Public Health Consultant Bengaluru,India.

Received Date: 11 November 2024 | **Accepted Date:** 18 November 2024 | **Published Date:** 25 November 2024

Citation: Suresh Kishanrao, (2024), Indolent Respiratory Viral Infections in Young Infants, *Clinical Medical Reviews and Reports*; 6(10): DOI: 10.31579/2690-8794/244

Abstract:

Come Autum (October-November) and Winter (December -February) many paediatric hospitals and Paediatric practitioners see a rush of patients with upper and lower respiratory infections (URI/LRI). Out of every 10 patients with high-grade fever and flu-like symptoms, six to seven patients have viral fever, and the rest report a plummeting platelet count and are diagnosed with dengue and other vector-borne diseases including chikungunya. Multiple viral fevers are causing alarm among the public and health authorities, for most of the year, Rhinoviruses & RSV cause most acute viral URIs among young infants & under 5's.

National Program for Integrated management of Neonatal and childhood illnesses both at community and facilities (IMNCI & FIMNCI) guide the management. Individual practitioners follow academic and IAP guidelines, though there are marginal variations among guidelines. Use of antibiotics even in viral infections is a matter of concern.

Basic Management practices include Symptom-based therapy as the mainstay Antimicrobial or antiviral therapy is appropriate in selected patients.

Materials & Methods: This article is based on 3 such cases recently. It highlights the diagnosis & management of RV and RSV-related respiratory infections in young infants in India based on IMNCI guidelines and Practices in Paediatric hospitals in private sector. Conflict interest determines the overtreatment in private sector.

Outcome: The first case of an unnamed baby in a district headquarters private facility though outcome was reverting to normal respiration in 5 days, but conflict of interest dominated the cost of management. The first and second cases of repeated URIs and respiratory distress are an example of need for assessing congenital heart diseases. Third case of normally mild Rhinovirus infection (common cold) leading to cerebrospinal fluid infection and Sudden Death Syndrome.

Conclusion: Early detection, prevention, and ongoing research are vital to mitigating the impact of RV & RSV on vulnerable population. Vigilance is necessary in the infant's environment, measures of hygiene, and protection by vaccinations be encouraged to reduce the risk of the Respiratory infections and SIDS in young infants.

Key Words: Neonates; young Infants, Respiratory viral infections; Bronchodilator; Upper/ Lower respiratory tract infection (URI/LRI) ; Rhinoviruses (RV), Respiratory Syncytial Viruses (RSV)

Introduction:

Bengaluru city hospitals, the hometown of the author, are reporting a rush of patients with flu-like illness along with upper and lower respiratory infections (URI/LRI) for almost a month now. Similar situation is reported from all the district and sub-districts town hospitals in Karnataka since early October 2024. Neonatology and Paediatrics outpatients are flooded with a surge of common cold, URI and LRI cases. Out of every 10 patients with high-grade fever and flu-like symptoms, six to seven patients have viral fever, and the rest report a plummeting platelet count and are diagnosed with dengue and other vector-borne diseases including chikungunya. Apart from viral fever, some are also reporting allergic respiratory disorders such as bronchial asthma and lung & upper respiratory tract infections [1-2]. Multiple viral fevers are causing alarm among the public and health authorities in the city.

In India we estimate that each infant may have 6-8 such episodes in the first year. URIs range from the common cold—typically a mild, self-limited, catarrhal syndrome of nasopharynx—to life-threatening illnesses such as epiglottitis. Mostly caused by the rhinovirus, symptoms include running nose, coughing, sneezing, watery eyes, sore throat, headaches, and body aches. Young Infants (< 2 months) and children (2-59 months) may develop fever, and otitis media. Young Infants progress to more severe disease like bronchiolitis, & pneumonia [1]. The top five manifestations are cough (92%), nasal congestion (58%), rhinorrhoea (53%), shortness of breath (50%), & dyspnoea (47%) [2-3].

Rhinovirus (RV) and Respiratory Syncytial virus (RSV) are the important and most common cause and primarily responsible for upper respiratory tract infections. A recent study has demonstrated that indolent Rhinovirus infection is frequent in infants with treatment-refractory, recurrent wheezing. These children do not show any signs of a systemic type 2 inflammatory response, but many of them show increased airway eosinophilia indicative of an emerging T2 inflammatory profile [2]. Isolation of rhinoviruses occurs in a distinct and consistent seasonal pattern that can be used to help determine whether an acute respiratory illness is caused by a rhinovirus.

Rhinoviruses comprise more than three quarters of viruses circulating in early autumn. In North India, spring is even more important time for rhinovirus transmission. Autumn is the time to harvest crops, and spring is when plants bear new leaves and flowers. The Seasons of India are majorly classified as Summer, Winter, Autumn, Spring and Monsoon. Autumn Season known as Sharad Ritu is from October to November and Spring season from February to March. Some popular festivals celebrated in autumn include Dusshera, Diwali, Durga Puja, and Navratri. Overall rates of respiratory illness are lower in summer, but Rhinoviruses are the most frequently isolated virus at this time of year. Influenza viruses and respiratory syncytial viruses (RSV), Parainfluenza virus (PIV), predominate in winter [4]. Thus, for most of the year, Rhinoviruses & RSV cause most acute viral URIs among young infants & under 5's.

This article is a review of Upper Respiratory viral infections (URI), possible complications and management, sometimes even exploitation with unnecessary treatment.

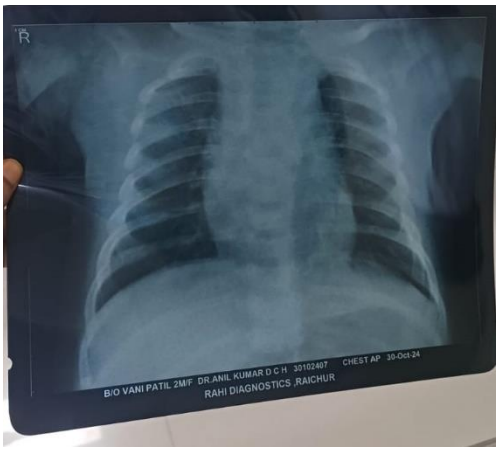
Case Reports:

1. **Baby of Vaani:** Anaamika (yet to be named), a 7-week-old baby, had her 2nd attack of common cold, running nose, cough, etc. since birth. As she developed fast breathing, vomiting and not feeding well for a day, compelled the mother to take her to a Paediatrician. After a general examination she had i) Basal lobe Wheeze, ii) sub-costal and lower intercostal chest indrawing, iii) Per abdomen- nothing abnormal iv) SPO2-95% v) Pulse rate=140/min, Temperature-101^0 F and Respiratory Rate =54/minute. The Paediatrician suspected Bronchopneumonia and admitted to a private ICU in Raichur, Karnataka. Initial investigations ordered were i) Comprehensive Blood Count (CBC) on 30 October 2024- Results (normal range in Parenthesis) Hb%=10.5 G (14-18 G/Dl), TC= 12960 cells (4K-10K) /Cu mm, Platelets 3.72L (1.4 to 4.4L) /Cu mm and CRP 1.18 mg (<2.8mg) /L. All other parameters were normal. Lab report read "Normocytic Normochromic Anaemia" ii) Serology Tests- Rapid Test Kit for Dengue NS1 antigen, IgG and IgM antibodies and all were negative. iii) Biochemistry Reports a) RBS=91 mg (70-140) /Dl, b) Blood urea=13 mg (10.8-38.4 mg)/Dl, c) Creatinine=0.3 mg (0.17-0.42)/Dl, d) Total Bilirubin=0.9 mg (0.3-1.2mg) /Dl {Conjugated 0.3 (0.1-0.25) mg/Dl + Free=0.6) iv) SGPT 37 (<40) IU / Dl, SGOT 92 (<40) IU/DL. v) Chest Xray- The lung zones and Both Cardio-Pulmonary angles were clear confirming
2. **No Radiographic abnormalities**.

   The baby was managed in ICU giving Oxygen, Injections Dexona (a steroid), Augpen (antibacterial), CTRL (to improve WBCs), Pantop {for Gastroesophageal reflux (GERD) diseases}, Emeset (anti-emetic), IV fluids ½ DNS & Nebulization with Budesol. **On the discharge day a 2-D was ordered which indicated congenital heart disease – (Peri-membranous VSD (1.55 mm), Left to Right shunt PFO (2mm) Left to Right Shunt.**

   The baby was discharged on 5th day in a stable condition with the instruction to

1. Exclusively breast feed & Burp after each feed
2) Keep the baby warm always.
3)Immunization as per schedule
4) Watch for signs of breathlessness, poor feeding, excessive crying, high fever, persistent vomiting, drowsiness and Convulsions and get immediate attention.



2. A 3-month-old infant with frequent URI's:

A three-month-old female baby, born at term weighing 2.7 kg, with no significant perinatal history, was brought in with complaints of a runny nose, noisy breathing for two days, and cough for one day associated with post-tussive vomiting to a private paediatric nursing home in early November 2024. This was her third episode after birth. The baby was admitted with respiratory distress in the form of chest retractions and tachypnoea. Her SpO2 was maintained at room air. Bilateral wheezing and crepitations on auscultation were noted, and the Downe's score was 4. There were no other features of sepsis, and her cardiac examination showed a systolic murmur for which 2D echocardiography revealed a patent foramen Ovale. She was managed symptomatically. The clinical examination indicated viral aetiology; therefore, a throat swab for RSV was performed & reported positive for RSV-B. The distress resolved with hypertonic saline nebulisations, the baby was afebrile and haemodynamically stable. After three days, she was sent home in good condition and did well on weekly follow-ups for a month.

3.A Sudden Death Syndrome of a Neonate due to Rhinovirus:

A 20-day-old male neonate, born near full-term following normal development. He had no family history of asthma or atopic status. The teenage mother was just 16 years old. He was exposed to cigarette smoke at home as his father was a chain smoker. On 15th October 2024 morning the boy was taken to general practitioner with complaint of running nose, cough and mild fever. The general practitioner referred the baby to a paediatric hospital attached to a private Medical College as he noted rhinitis, congestion, severe chest indrawing and Wheeze. After a general examination and collection of blood, nasopharyngeal & Cerebrospinal fluid, and a rectal swab sample, he was put on IV broad spectrum antibiotics. By the evening the infant appeared well and was put to sleep in a safe position. The infant was found cold and white in his bed, in the supine position early in the morning next day. Emergency services- on site, intubation, gamma adrenalin was administered, and the infant was in asystole. Following the sudden cardiopulmonary arrest that occurred at the hospital itself, the neonate with symptoms of rhinitis died unexpectedly in his sleep. Cerebrospinal fluid, and nasopharyngeal and rectal swab were found to be positive for subgroup A rhinovirus, The blood was negative. The rhinovirus, a common pathogen associated with upper respiratory tract infections, sometimes, leads to cerebrospinal infection and leads to the sudden infant death syndrome (SIDS).

Discussions:

Rhinovirus and Respiratory syncytial virus (RSV) infection commonly present with acute upper (AURI) and lower respiratory tract infection (ALRI) in children and carries high morbidity and mortality [1-2]. An estimated 33 million cases occur globally every year, resulting in nearly 1.4 million hospital admissions and about 125,000 deaths in under-5 children. low-income & lower-middle income countries (LICs &LMCIs)) bear a substantial burden of these conditions with approximately two thirds of cases and 82% of deaths [3].

In recent years, there has been a growing recognition of AURI due to Rhinovirus isolation from the respiratory tract and ALRI due to RSV in neonates, with reported rates of RSV isolation in neonatal intensive care units (NICUs) ranging from 1 to 4% during winter epidemics [3-7]. RSV infection in neonates is associated with increased risk for morbidities like bronchopulmonary dysplasia and higher mortality [6]. Most of these effects have been primarily observed in high-risk preterm infants, the impact of RSV on healthy neonates and young infants is still not clear.

Table 1. Clinical manifestations of respiratory tract infections caused by Rhinovirus & RSV

Sl. No	Rhinoviruses Infections	Respiratory Syncytial Viruses (RSV) Infections
1	Rhinorrhoea	Runny nose, Coughing, Sneezing, Wheezing
2	Sore throat	Fever
3	Nasal congestion	Loss of appetite
4	Sneezing	In very young babies, the only symptoms may be fussiness, less activity, and troubled breathing
5	Cough	In severe cases, can become lower respiratory Infection, causing pneumonia or bronchiolitis
6	Headache Fever unusual, if present low grade Loss of sense of smell and taste Hoarseness	Signs & symptoms of severe cases include: Severe cough, Rapid breathing or difficulty breathing, Cyanosis (Bluish colour of the skin) due to lack of oxygen

Rhinovirus Infections: Published report of Rhinoviruses isolation from the respiratory tract of 48 paediatric hospitalized patients visiting a paediatric emergency room during the period of July 1985, through December 1988. Twenty-eight (58%) of the patients presented during the spring and early summer. Forty-one (86%) of the 48 patients were less than 12 months of age. All except four of the patients had viral cultures performed. Bronchiolitis was the single most frequent clinical diagnosis and was noted in equal proportion among children less than 3 months and 3 to 12 months of age. Nine patients were assigned a diagnosis of suspected sepsis. Rhinovirus infection was a complication of underlying illness for 17 (44%) of the 40 hospitalized patients, and those patients tended to be older than the otherwise healthy hospitalized infants with rhinovirus. Twenty-six patients (54%) were treated with antibacterial agents, although only one patient was documented to have a concomitant bacterial infection (Chlamydia trachomatis). Overall rhinovirus isolation during the study period represented 0.7% of all specimens submitted for viral isolation compared with 8.2% for respiratory syncytial virus. Rhinovirus infection leads to hospitalization less frequently than does respiratory syncytial virus infection, but the severity of illness and clinical presentation in young infants are similar [1-3].

Indolent Rhinovirus infections will be predictive of the future development of persistent wheeze, potentially leading to asthma, according to the findings of a study presented at the 2024 Annual Scientific Meeting of the American College of Allergy, Asthma & Immunology held last month in Boston, USA [3]

In a study of preschool children, 5 years and younger, with treatment-refractory wheeze, Rhinovirus was detected in 27% of bronchoalveolar lavage fluid samples despite the absence of clinical symptoms. Indolent Rhinovirus infection could help identify infants at ensuing risk for asthma supported by the emergence of an early type 2 (T2) inflammatory signature [3,4]. A total of 468 children underwent BAL collection & phlebotomy to examine granulocyte counts and markers of inflammation. Eosinophilic activation and chemoattraction markers were determined via Quantitative PCR. Infants with low-level Rhinovirus infection (RV+) showed no signs of systemic type 2 (T2) inflammation compared to RV-negative (RV-) participants, as indicated by similar blood eosinophil counts (280/μL in RV+ vs 210/μL in RV-), comparable total IgE levels (46 kU/L in RV+ vs 51 kU/L in RV-), and similar rates of atopy (48.8% in RV+ vs 51.8% in RV-). However, 30% of children with Rhinovirus exhibited eosinophilic airway inflammation compared to 23.2% of children without Rhinovirus. This airway eosinophilia was linked to a nearly four-fold increase in mRNA expression of CCL5 (RANTES), CCL11 (Eotaxin), CCL24 (Eotaxin-2), and IL-25, though levels of IL-33 and TSLP were not elevated. This study demonstrated that indolent Rhinovirus infection is frequent in infants with treatment-refractory, recurrent wheezing. Although these children show no signs of a systemic type 2 inflammatory response, many of them show increased airway eosinophilia indicative of an emerging T2 inflammatory profile [3].

A cross-sectional analytical study of 249 children aged between 2 months-5 years consulting the Paediatric wards and OPD with complaints of fever with cough, cold, breathlessness, and chest pain, after a comprehensive medical history general and systemic examinations, and CBC and x-ray reported i) The male: female ratio in the study was 137:112. Cold (80.72%) and

cough (74.3%) were the most widely experienced symptoms among patients, while chest pain (0.8%) was the least common because most children were unable to express. Among 249 cases, upper respiratory tract infection (URTI; 60%) was more predominantly noted than lower respiratory tract infections (LRTI; 44.8%). Nasopharyngitis (34.14%) and tonsillopharyngitis (6.83%) were the commonly prevalent types of URTI whereas pneumonia and bronchiolitis were the most recurrent types in the LRTI [6].

The rhinovirus, a common pathogen associated with upper respiratory tract infections, sometimes, leads to cerebrospinal infection and progress to the sudden infant death syndrome (SIDS) [8].

Respiratory Syncytial Virus Infections:

The RSV is a member of the Paramyxoviridae family and contains a continuous, single-stranded, negative-sense Ribonucleic acid (RNA) genome [5]. Human RSV (hRSV) is the most common cause of bronchiolitis and pneumonia in children under 12 months of age [1, 5, 7]. More severe disease in the youngest infants is related to decreased levels of maternally derived RSV-specific antibodies and physical, immune, and viral factors. The RSV accounts for up to 16% of children hospitalised in India for Acute Respiratory Infections (ARI), with the highest incidence in infants under six months of age. Data from a community-based study in India showed RSV-associated incidence of hospitalisation per 1000 child years was 3.2 among children <5 years of age [7]. In India, almost 3 million children die each year, with ARI accounting for one-fifth of these deaths [8]. RSV mainly spreads through aerosols or direct contact with infected surfaces, where the virus can remain virulent for hours. RSV manifests as rhinorrhoea, nasal congestion, cough, sneezing, and occasionally fever and myalgia.

After the viruses replicate in the nasopharynx during the first 4 to 5 days of incubation, they cause LRTI. Clinical suspicion of RSV-induced LRTI, particularly bronchiolitis, relies on clinical and epidemiological features in infants and young children. Laboratory confirmation and imaging studies are essential to differentiate RSV from other disorders.

A study on the clinical profile & outcomes in neonates hospitalized with respiratory syncytial virus (RSV) infection recorded clinical features, respiratory support, pharmacological treatment, complications and outcomes of neonates admitted to the neonatal intensive care unit with RSV infection between January 2018 and March 2023. Thirty-seven neonates with RSV infection were analysed. The most common presenting features were cough (n = 29, 74.4%), refusal to feed (n = 29, 74.4%) and apnoea (n = 7, 17.9%). While 19 (48.7%) neonates were mechanically ventilated, 28 (71.8%) required non-invasive respiratory support and 13 (35.1%) required bronchodilator therapy. The study concluded that Neonates with RSV infection requiring hospitalization have considerable respiratory morbidity requiring prolonged respiratory support and pharmacological therapy.

Ventricular septal defect (VSD) & Respiratory Infections Association:

A ventricular septal defect (VSD) is a hole in the heart that changes the direction of blood flow can make a newborn, young infant and even adult person more prone to respiratory infections. This causes oxygen-rich blood to flow back into the lungs instead of out to the body, mixing with oxygen-poor blood. The common symptoms babies with large VSDs experience are Shortness of breath, Fast breathing, Difficulty feeding, Slow weight gain and Frequent respiratory infections. Therefore, every young infant with frequent respiratory infections must be investigated to rule out VSD.

Approach to Respiratory Infection among young Infants in India:

Integrated management of Neonatal and Childhood Illness in India at primary care provider level recommends two-pronged approach. One for young Infants (0-2 months) and another for 2-59 months old children.

SICK YOUNG INFANT (YI) AGE UPT0 2 MONTHS: The care provider must Assess, Classify and Identify Treatment. First of all, one must Check for Possible Bacterial Infection/ Jaundice by noting if the YI has i) Convulsions or ii) Fast breathing (60 breaths per minute or more) or iii) Severe chest indrawing or iv) Nasal flaring or v) Grunting or vi) Bulging fontanelle or viii) 10 or more skin pustules or a big boil or ix) If axillary temperature 37.5oC or above (or feels hot to touch) or temperature less than 35.5oC (or feels cold to touch) or x) Lethargic or unconscious or less than normal movements xi) If the child has Palms and soles yellow within < 24 hours or after 14 days or more, one must suspect serious bacterial infections and Refer to a hospital after giving the first dose of intramuscular ampicillin and gentamicin with instruction to treat to prevent low blood sugar, keeping the young infant warm by Skin to Skin contact if temperature less than 36.5^{o}C (or feels cold to touch) while arranging referral.

Then ask if the YI has respiratory symptoms like cough, nasal congestion, inability feed etc. i) Then Count the breaths in one minute and reconfirm by Repeat count if elevated. ii) Look for severe chest indrawing iii) Look for nasal flaring iv) Look and listen for grunting and look and feel for bulging fontanelle v) Measure axillary temperature (if not possible, feel for fever or low body temperature) vi) See if the young infant is lethargic or unconscious vii) Look at the young infant's movements and note if they are less than normal. Manage locally if there are no signs of severe chest indrawing and respiratory rate is less than 60 per minute and there is no hyperthermia or hypothermia.

For children aged 2-59 months, there is a bit modification. The danger signs for quick referral include asking for i) Inability to drink or breastfeed ii) vomiting everything eaten or drunk? iii) convulsions? And advises to look for if the child is lethargic or unconscious) ask for duration of the illness. Then examine the child ensuring that the child is calm.
LOOK, LISTEN: i) Count the breaths in one minute, infer the child is Fast breathing if a) 2 months to 12 months -50 breaths / min or more b) if 12 months to 5 years - 40 breaths /minute or more.
ii) Look for chest indrawing iii) Look & listen for stridor. **Classify COUGH or DIFFICULT BREATHING:**

1. Any general danger sign or • Chest indrawing or • Stridor in calm child **classify as Severe pneumonia or very severe disease** ¬Give first dose of injectable chloramphenicol (or oral amoxycillin) and Refer URGENTLY to hospital.

2. **Fast breathing. PNEUMONIA** ¬Give Amoxycillin for 5 days. ¬Soothe the throat and relieve the cough with a safe remedy if child is 6 months or older. Advise mother when to return immediately. ¬Follow-up in 2 days. No signs of pneumonia or very severe disease.
3. **No pneumonia: Cough or Cold** ¬If coughing more than 30 days, refer for assessment. Soothe the throat and relieve the cough with a safe home remedy if child is 6 months or older. Advise mother when to return immediately. ¬Follow-up in 5 days if not improving.

Treatment: Give oral antibiotic drug to be given at home, with i) Determine the appropriate drugs and dosage for the infant's age or weight ii) Tell the mother the reason for giving the drug to the infant iii) Demonstrate how to measure a dose iv) Watch the mother practise measuring a dose by herself v) Ask the mother to give the first dose to her infant vi) Explain carefully how to give the drug, then label and package the drug vii) If more than one drug is given, collect, count and package each drug separately viii) Explain that all the drug tablets or syrups must be used to finish the course of treatment, even if the infant gets better [10].

Facility Based Management guidelines-: Steps in the management of children brought to hospital [11]:

1. TRIAGE: Check for emergency signs, if yes, do EMERGENCY TREATMENT

   Triage of all sick children for Respiratory Illnesses includes:

   • Not breathing or Gasping, >> Manage airway, Start life support or

   • Obstructed breathing, or • Central cyanosis, or • Severe respiratory distress>> Manage airway, give oxygen and make sure child is warm

2. HISTORY & EXAMINATION
3. POINT OF CARE/BEDSIDE INVESTIGATIONS,
4. List and consider DIFFERENTIAL DIAGNOSIS & Decide the need for HOSPITALIZATION/REFERRAL
5. Plan and begin INPATIENT TREATMENT (including supportive care)
6. Laboratory investigations, x-ray etc, if required
7. MONITOR for a) Response to treatment, b) Complications
8. If improving CONTINUE Management, • COUNSEL and • PLAN DISCHARGE
9. If not improving or new complications- Revise diagnosis, treatment & treat complications

Key Investigation apart from Rapid Test kits:

1. **Serum SGOT & SGPT:** A serum gamma-glutamyl transpeptidase (SGOT), or aspartate aminotransferase (AST), test is ordered if liver problem is suspected such as Jaundice Dark pee, Nausea, Vomiting, and Belly pain. AST is an enzyme that helps the liver convert food into energy. A normal SGOT level for a newborn is 25 to 75 U/L, and for an infant it's 15 to 60 U/L. An elevated ratio of (SGOT) to serum gamma-glutamyl transpeptidase (GGTP) can indicate infantile obstructive cholangiopathy in infants. Low levels are observed in premature infants likely due to immaturity of enzyme synthesis.
2. **Rapid Antigen & Antibody Test Kits**: Rapid antigen testing for RSV are quick and inexpensive but are less sensitive and carry a higher false-negative rate.
3. **Culture & PCR Tests**: PCR-based testing, and viral culture are definitive tests but not available except in big cities.
4. **2 D Echocardiogram:** A 2 D echocardiogram is the most reliable way to identify a VSD. A pVSD can be seen in the subcostal short- and long-axis planes, the apical 4-chamber, parasternal long axis, and parasternal short-axis scan planes. A pVSD is associated with genetic abnormalities and worse clinical outcomes than other types of VSDs. The size of the VSD is documented as small, medium, or large. Small defects are only visible on colour-flow Doppler and/or are less than 2 mm in diameter. Medium defects are visible on two-dimensional (2D) and colour-flow Doppler and are greater than 2 mm in diameter. Large defects are visible on 2D alone and are similar in size to the aortic valve. A first trimester screening for chromosomal abnormalities can help identify patients at a higher risk for cardiac defects [7].

Management of Respiratory Infections in Young Infants:

Basic Management practices include Symptom-based therapy as the mainstay Antimicrobial or antiviral therapy is appropriate in selected patients. Many Paediatricians in India practice to admit the patient to the nearest hospital, monitor for respiratory efforts and fatigue, visually and with continuous pulse oximetry, administer oxygen according to pulse oximetry results, be ready for intubation if necessary. Start intravenous (IV) fluids to correct volume deficits and push in antibiotics after collecting culture specimens. Empiric coverage with ceftriaxone or other third-generation cephalosporins, cefuroxime is used [1,6-7].

Providing Life Support:

Unresponsive child - Shout for help/ Activate Emergency response system (ERS) team within 5 seconds Limit Persons to ERS team

• Look for breathing • Check central pulse (5-10 seconds)

• Start CPR: Begin cycles of 15 CHEST COMPRESSIONS and 2 BREATHS • If available, attach cardiac monitor, analyse rhythm, and use defibrillator if rhythm shockable*

• No breathing /Gasping: Provide rescue breathing with bag & mask: Give 1 breath every 3 seconds (Use bag & mask device with filter and tight seal

• Reassess pulse every 2 minutes.

- If no pulse felt: Continue chest compression, continue ventilation, • Put IV/IO line
- • Use defibrillator, if rhythm shockable*: *1st dose 2 J/ Kg; second dose 4 J/Kg; subsequent dose >= 4 J/kg; maximum 10J/Kg, **Give epinephrine every 3-5 minutes; 0.01 mg/kg (0.1 ml/kg of 1:10000 concentration); max. of 1 mg (10 ml).
- Call for help, consider advanced ventilation if available, • Start medication**, • Consider transfer to ICU setting
- If Pulse is palpable but less than 60/minute continue same as listed above.
- More than 60/minute: Stop chest compression, • Continue ventilation for 2 minutes
  • Assess for spontaneous breathing efforts.
  <u>If no or Poor Response</u>: Continue bag & mask ventilation with oxygen, 1 breath every 3 sec., Reassess every 2 min,
  If Spontaneous breathing efforts present: Stop bag & mask, put in recovery position, give oxygen and continue further assessment.
  add chest compressions, if pulse remains = 4 J/kg; maximum 10J/Kg **Give epinephrine every 3-5 minutes; 0.01 mg/kg (0.1 ml/kg of 1:10000 concentration); max. of 1 mg.
- In severe cases, oxygen and respiratory support are recommended based on the child's clinical status to maintain a target SpO2 of 92-95% in young infants.
- Antibiotics are also given routinely despite their limited indications in viral infections.

CONCLUSION:

The present case series highlights the diagnosis and management of RV and RSV-related respiratory infections in young infants in India.

Early detection, prevention, and ongoing research are vital to mitigating the impact of RSV on this vulnerable population.

Vigilance is necessary in case of viral infections in the infant's environment, and measures of hygiene and protection by vaccines must be encouraged to reduce the risk of Respiratory infection among all children and the SIDS young infants.

References:

1. Vamshi Venkat M et.al (2024). Clinical Profile & Outcomes in Neonates & young infants with Rhinoviruses & Respiratory Syncytial Virus Infection.
2. J A McMillan et.al (1993). Rhinovirus infection associated with serious illness among paediatric patients, *Pediatr Infect Dis J.* 1993 Apr;12(4):321-5).
3. Surya Kant (2024).Indolent Rhinovirus Infection in Preschoolers with Recurrent Wheeze: A Predictor of Future Asthma, , November 2024,
4. Arnold S Monto et.al, (2002).The seasonality of rhinovirus infections and its implications for clinical recognition, *Clin Ther*. 2002 Dec;24(12):1987-97.
5. Upper Respiratory Tract Infection, Zab Mosenifar, 302460- 05/31/2024
6. Jinela Desouza et.al (2024) .Current clinical profiles of acute respiratory tract infections in children between 2-59 months. 5815/01/25/2024.
7. Saha S, et al. (2015) Evaluation of case definitions for estimation of respiratory syncytial virus associated hospitalisations among children in a rural community of northern India. *J Glob Health*. 2015;5(2):010419
8. Estimates of world-wide distribution of child deaths from acute respiratory infections. Williams BG, et.al, *Lancet Infect Dis*. 2002;2(1):25-32.
9. Sudden Infant Death Associated with Rhinovirus Infection, Christelle Auvray,
10. Imnci_chart_booklet.pdf, https://nhm.gov.in/images/pdf/programm guidelines/2005
11. Revised-F-IMNCI-Modules-2023/FIMNCI-Chart-Booklet-2023.pdf