



# Aetiologies and Management of Retropharyngeal Abscess in Paediatric Age group

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## ABSTRACT

### Introduction

Retropharyngeal abscess (RPA) is deep neck space infection which requires prompt diagnosis and management due to its potential life-threatening nature. In paediatric group it is most common between 3-5 years of age with infants presenting it very rarely. We are reporting a case series of all the children who were diagnosed of RPA and managed successfully.

### Materials and Methods

This is a single-center, retrospective study conducted at the tertiary care hospital. Detailed data from the case files of patients who were diagnosed and managed for RPA from 2012 to 2022 were included. The demographic details, presenting complaints, site of involvement, CT findings, intra-operative findings, pus culture report and course of child during hospitalization was meticulously documented along with their follow up findings and analysed.

### Results

Total number of children who underwent treatment for RPA during the study period is 17. Maximum number of cases were below 4 years of age accounting for 65%. 58.8 % had an episode of upper respiratory tract infection before developing the RPA. 2 patients were diagnosed to have tuberculosis and had started on anti tubercular treatment. One child had sustained injury to neck, and one had history of chicken bone ingestion. Five children showed the complications of which 60% of them were infant.

### Conclusion

The crucial step in infants with RPA is prompt diagnosis and aggressive management. Initial antibiotics should be a broad spectrum until the pus culture sensitivity reports are available. There is a recent trend is Methicillin resistant staphylococcus aureus especially in younger children. Paradoxical reaction of tubercular treatment is rare and should be borne in mind of its possibilities while treating.

### Keywords

Retropharyngeal Abscess; Paediatric Neck Abscess; Methicilin Resistant; Staphylococcus Aureus; Paradoxical Tuberculosis

Retropharyngeal abscess (RPA) is a deep neck space infection which requires prompt diagnosis and management due to its potential life-threatening nature.<sup>1</sup> This is due to its anatomical location which when progressed leads to upper airway obstruction. It has various clinical presentations ranging from nonspecific symptoms like fever, irritability, poor appetite, sore throat to more severe presentations like drooling of saliva, difficulty swallowing, neck swelling and respiratory distress.<sup>1-3</sup> It usually follows upper respiratory tract infection (URTI) in children who are more prone for adenotonsillitis and middle ear infections. In adults it

usually follows trauma, foreign body ingestion, history of instrumentation like endoscopy or immune compromised status and tubercular in older children.<sup>1,2,4</sup> In pediatric group it's most common between 3-5 yrs of age with infants presenting it very rarely.<sup>2-5</sup> This paper is aimed to determine the aetiology and outcomes of the children

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diagnosed and managed with retropharyngeal abscess (RPA) at a tertiary care centre.

### Materials and Methods

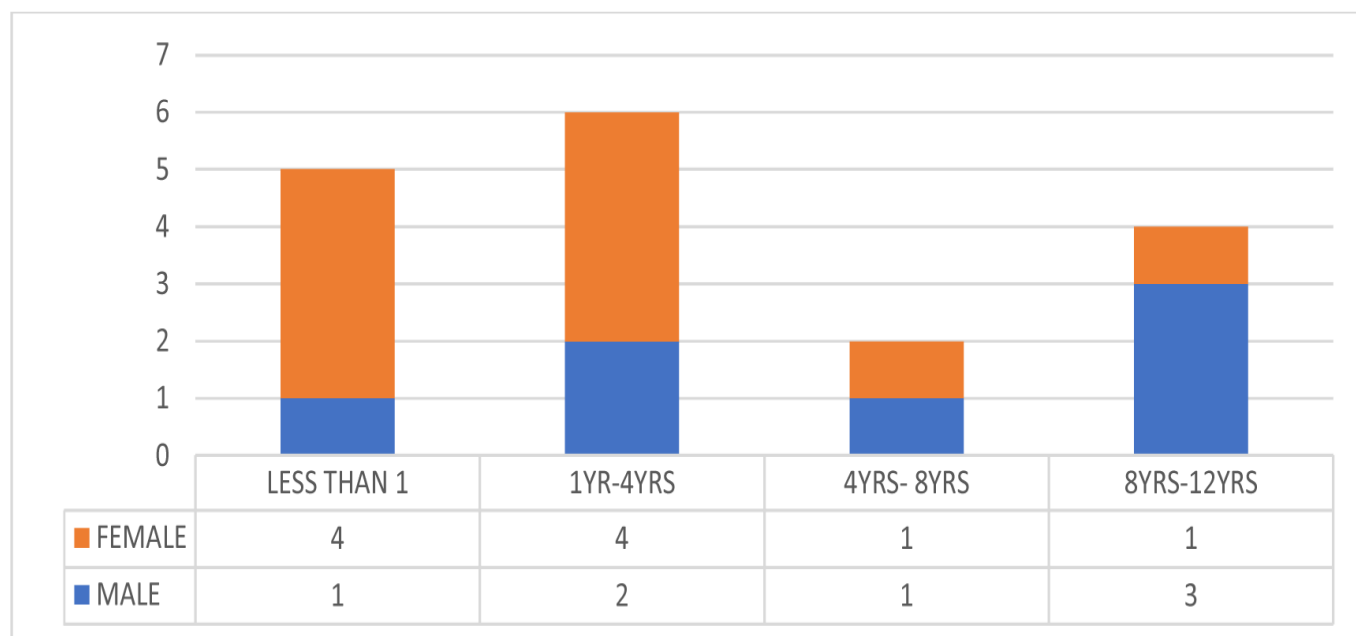
This is a single center, retrospective study conducted at the tertiary care pediatric hospital. Detailed data from the case files of patients who were diagnosed and managed for RPA from 2012 to 2022 were included. Exclusion criteria was the case files with inadequate data.

The demographic details, presenting complaints, site of involvement, CT findings, intra-operative findings, pus

culture report and course of child during hospitalization was meticulously documented along with their follow up findings. This was entered into an excel sheet and analyzed.

### Results

Total number of children who underwent treatment for RPA during the study period is 17. When analysed for age distribution we found, maximum number of cases were below 4 years of age accounting for 65%. Female outnumbered the male with (F:M-10:7) [Fig 1].



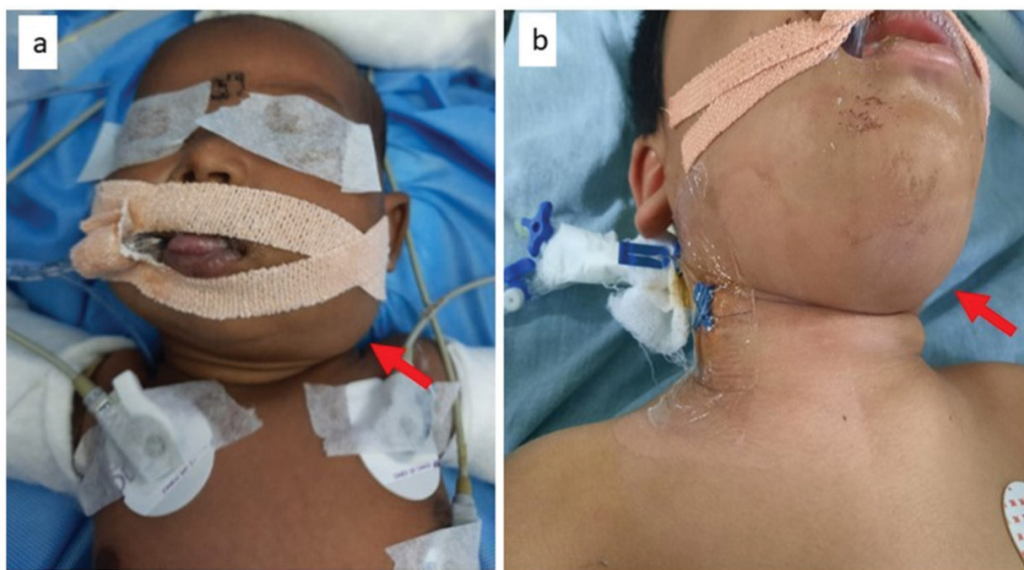
**Fig. 1. Distribution according to age and gender**

Various presenting complaints were observed (Table I). All 17 children had history of fever and difficulty swallowing. Next common symptom was swelling of neck (70%). Throat pain was seen in 64.7%. Stridor was seen in 8 children accounting for 47% among which 7 were below 2 years. Inconsolable cry was seen in 5 children who all were below 1 year of age. Irritability was seen in 2 neonates and 3 children showed torticollis (Fig. 2).

Duration of presenting symptom ranged from 2days-2months. Most of them were within 5-10days (64.7%). When the aetiology was analysed, 58.8% had an episode of URTI before developing the RPA. 2 patients were diagnosed to have tuberculosis and had started on anti tubercular treatment. One child had sustained injury to neck, and one had history of chicken bone ingestion.

TABLE I: Clinical features and aetiology of all the children included in this case series

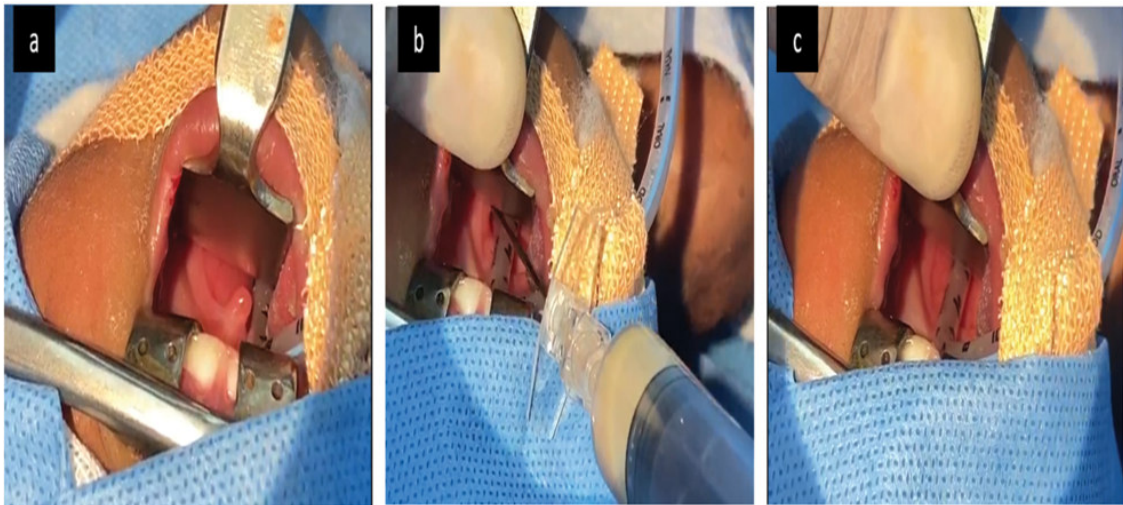
CASE NUMBER	AGE AND GENDER	DURATION	NECK SWELLING	THROAT PAIN	STRIDOR	INCONSOLABLE CRY	IRRITABILITY	TORTOCOLLIS	AETIOLOGY
1	12y/M	2	NO	YES	NO	NO	NO	NO	Developed symptoms spontaneous
2	10m/F	10	YES	NO	NO	NO	NO	NO	Following URTI
3	3m/F	10	NO	YES	YES	YES	NO	NO	Following URTI
4	1y/M	7	YES	NO	YES	YES	YES	NO	Following URTI
5	10m/M	10	YES	NO	YES	YES	NO	NO	Following URTI
6	1m 20d/F	5	YES	NO	YES	YES	YES	NO	Following URTI
7	1m 8 D/F	8	YES	YES	YES	YES	NO	NO	Following URTI
8	8y/M	7	YES	YES	No	NO	NO	NO	Suspected for Diphtheria → swab was negative → CT was advised
9	2.6y/F	10	YES	NO	NO	NO	NO	NO	Following URTI
10	2y/M	35	YES	YES	NO	NO	NO	NO	Following URTI
11	2y/F	20	YES	YES	YES	NO	NO	NO	Following URTI
12	2.3y/F	4	NO	YES	NO	NO	NO	YES	Following URTI
13	7y/M	5	YES	YES	NO	NO	NO	NO	Developed symptoms spontaneous
14	1.6y/F	45	YES	YES	YES	NO	NO	NO	Multiple neck swelling with discharging sinuses and was diagnosed as TB by biopsy. Child was started on ATT and she developed distress within a week
15	11y	60	YES	YES	YES	NO	NO	YES	Recently diagnosed with TB and was started on ATT 20days back following which he developed the symptoms
16	9y	3	NO	NO	NO	NO	NO	YES	FOREIGN BODY INGESTION
17	7Y 11M	7	NO	YES	NO	NO	NO	NO	INJURY TO NECK



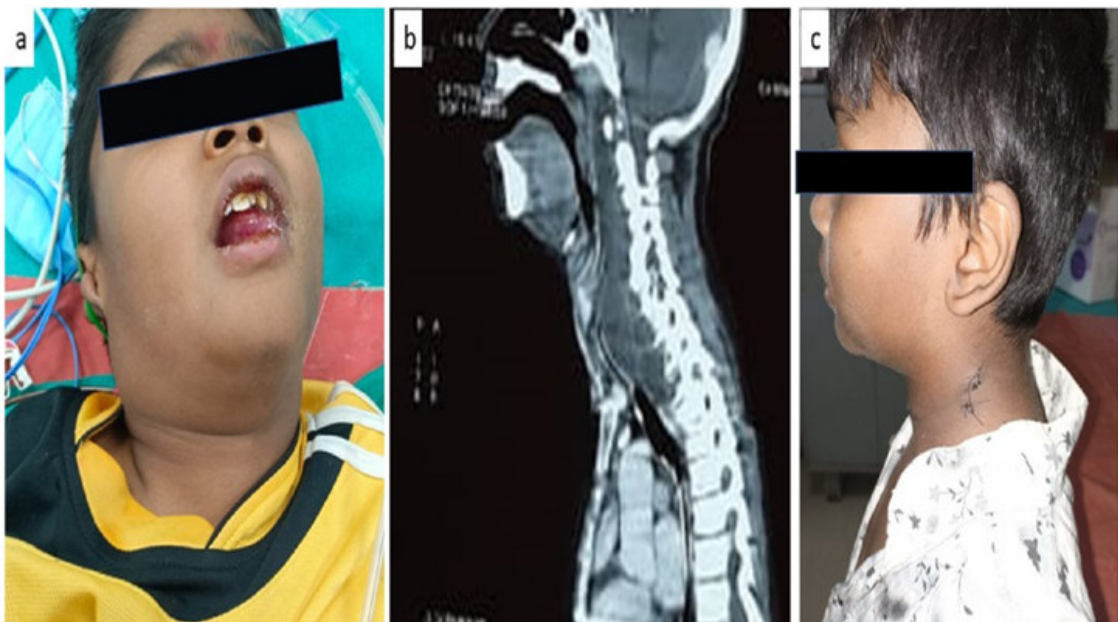
**Fig. 2.** Clinical picture showing: (a) a 1 Month 20days old female child with swelling on left side of the neck with torticollis; (b) 8 years old boy with neck swelling who were diagnosed as RPA



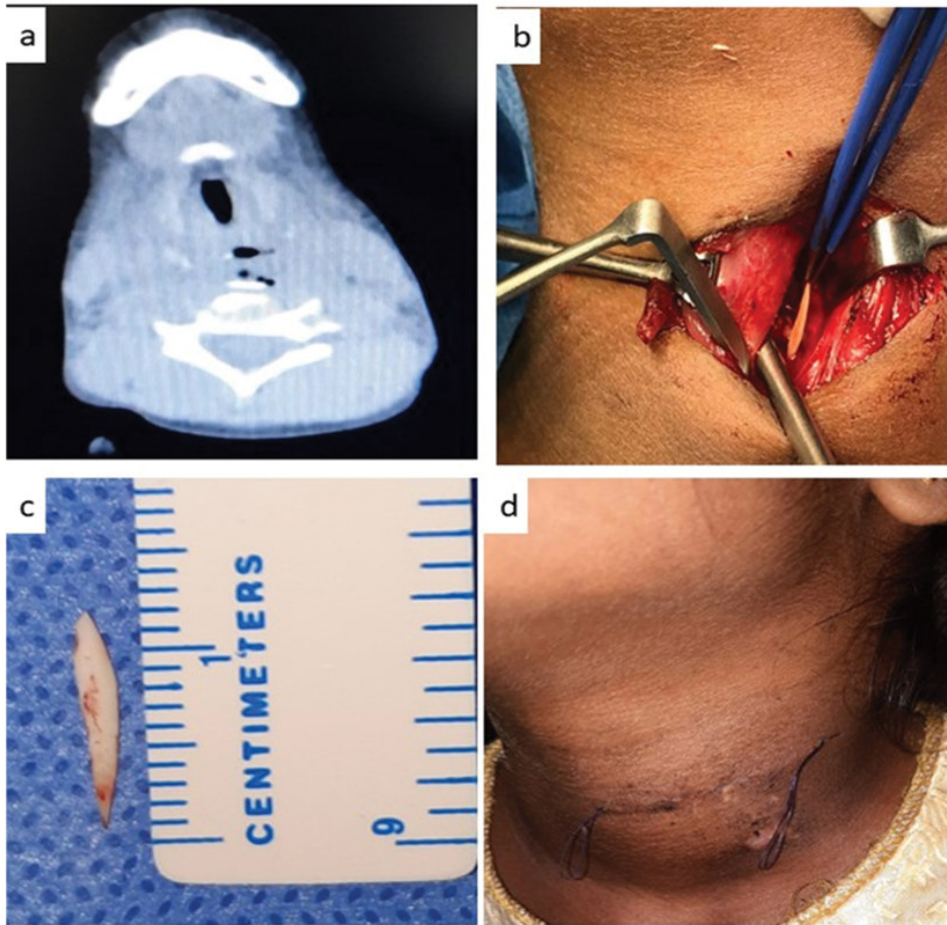
**Fig. 3.** (a) Coronal section. (b) Sagittal section of contrast enhanced computerized tomography (CECT) of neck and thorax showing RPA predominantly seen on left paramedian region extending from base of skull to C7 level with symmetrical narrowing of nasopharynx and oropharyngeal airway. Cervical spinal vertebrae appears normal without any erosions.



**Fig. 4.** Intra operative pictures of a 2 and half month-old infant undergoing incision and drainage via oropharyngeal route. a) Examination of oropharynx under GA. Note the asymmetric bulge over posterior pharyngeal wall predominantly on left side. (b) Intra operative picture of aspiration using an 18-gauge spinal needle. Note the pus collected in the syringe. (c) Post-operative picture showing reduction of bulge over posterior pharyngeal wall.



**Fig. 5.** 11 years old male child previously diagnosed with tuberculosis who was on anti tubercular treatment presented with neck swelling, stridor and new onset of fever. (a) Note the neck swelling; (b) CT scan showing large multi loculated cystic density of 12\*1.67.2cm vol 71cc seen involving midline prevertebral, retropharyngeal region of neck from C2 to D4 causing compression of anterior structures ; (c) Post operative scar picture of external cervical approach to drain the pus.



**Fig. 6.** Nine years old female child with history of chicken bone ingestion who presented with dysphagia and odynophagia. (a) Coronal section of CT of neck showing well defined RPA with air foci within and hyperdense foci measuring 1\* 0.4 cm with 2.5mm thickness is noted within the collection at C5 vertebra; (b) Intra operative picture showing lateral neck approach retrieving the foreign body; (c) foreign body removed; (d) Post operative scar picture.

All children had undergone CT scan for diagnostic purposes and showed definitive evidence of RPA (Fig. 3).

For removal of the collected abscess surgical management was planned. 16 children underwent incision and drainage via oropharyngeal route and had complete removal of pus (Fig. 4). Under general anaesthesia, Boyle Davis mouth Gag with blade was introduced cautiously and the oropharynx was visualized. Bulge over posterior pharyngeal was examined and using an 18-gauge spinal

needle the abscess was aspirated. Followed by introduction of negus right angled tonsillar artery forceps into the opening and breaking of all the locules around the abscess was done. Betadine-soaked ribbon gauze was kept into the cavity for 5minutes and removed. The aspirated pus was sent for culture sensitivity.

Two children required lateral neck exploration in which one was to retrieve the foreign body and one child for clearance of pus due to inaccessibility to the area via oropharyngeal route. (Figure 5 & 6).

When the pus c/s report was analysed, 29.4% of them showed Methicillin resistant staphylococcus aureus (MRSA). It is interesting note that all these 5 children were under 1 year. Other organisms grown were Klebsiella, Staphylococcus Aureus, Streptococcus species. 4 children showed no growth (Table II).

**Table II: Culture sensitivity report and the complication observed**

CASE NUMBER	AGE AND GENDER	AETIOLOGY	PUS CULTURE GROWTH	COMPLICATIONS
1	12y / M	Developed symptoms	Strept. pyogenes	NIL spontaneous
2	10m / F	Following URTI	MRSA	Pleural effusion with lung consolidation
3	3m / F	Following URTI	MRSA	Recurrent collection
4	1y / M	Following URTI	MRSA	NIL
5	10m / M	Following URTI	MRSA	IJV thrombosis+ Pleural effusion+ lung consolidation
6	1m 20d / F	Following URTI	MRSA	NIL
7	1m 8 D / F	Following URTI	MSSA	NIL
8	8y / M	Suspected for Diphtheria → swab was negative → CT was advised	Strept. pyogenes	NIL
9	2.6y / F	Following URTI	Klebsiella	NIL
10	2y / M	Following URTI	NO GROWTH	NIL
11	2y / F	Following URTI	NO GROWTH	Recurrent collection
12	2.3y / F	Following URTI	Staph. Aureus	NIL
13	7y / M	Developed symptoms	Klebsiella	NIL spontaneous
14	1.6y / F	Multiple neck swelling with discharging sinuses and was diagnosed as TB by biopsy. Child was started on ATT and she developed distress within a week	NO GROWTH	NIL
15	11y	Recently diagnosed with TB and was started on ATT 20 days back following which he developed the symptoms	NO GROWTH	Erosion of C2 – D4 vertebral bodies + Pleural effusion with lung consolidation
16	9y	FOREIGN BODY INGESTION	α haemolytic strept.	NIL
17	7Y 11M	INJURY TO NECK	Staph. Aureus	NIL

Case 3 developed spikes of fever after the procedure and hence repeat CT was done which again showed collection which was drained under general anesthesia. Case 11 had an initial I and D done outside and was referred to us as the symptoms did not improve. Repeat CT showed recollection and the procedure was repeated. Post the 2<sup>nd</sup> drain, child recovered well.

Duration of treatment was less than a week in 35.2% of them. All the MRSA positive children were treated with antibiotics for 3 weeks. 2 children took more than 3 weeks as they had to complete their anti-tubercular treatment.

Five children showed the complications of which 60% of them were infant:

- Two children had lung abscess.
- Two had recurrent collection of RPA
- One had IJV thrombosis with lung consolidation and
- One had subluxation of vertebral body.

## Discussion

Retropharyngeal space extends from base of skull upto mediastinum which is bounded laterally by carotid sheaths lying behind buccopharyngeal membrane and anterior to alar fascia ie; deep cervical fascia. This space beholds lymph nodes which drain from nasopharynx, nose and paranasal sinuses.<sup>4</sup> Hence the infection can spread secondary to adenotonsillitis, pharyngitis and rhinosinusitis. The suppuration of lymphnode is thought to cause retropharyngeal abscess. The infectivity in adults is more due to trauma, foreign body ingestion and history of instrumentation like endoscopy or compromised immune status.<sup>1,2,4</sup> In pediatric group retropharyngeal abscess is most seen between 3-5 yrs of age.<sup>2,5</sup> Following which the incidence reduces because retropharyngeal lymph nodes atrophies.<sup>3</sup> In our study we have 65% of them within 4 years of age. Among them, maximum number of cases were within 1 to 4 years of age 6 (35.2%) and 5 (29.4%) cases were infants. Presentation in this age group is life threatening due to their immature immune system.

There are various clinical presentations depending on the extension of space involved. The children usually

present with fever, sore throat, drooling of saliva, refusal to feed, neck swelling, respiratory distress, or stridor.<sup>1-3</sup> All our children presented with fever and dysphagia. Many studies have shown fever to be the most common symptom accounting for 70-90% of.<sup>2,4,5</sup> Next common symptom seen was neck swelling (12). In study by Huang MC et al on deep neck space infection in children found neck swelling (82.7%) as the most common symptom and suggested to rule out DNI whenever a child presents with neck swelling.<sup>6</sup>

Current study showed stridor in 8 children (47%) and 7 of them were 0-2 years old. In couple of studies, it is shown that airway symptoms are more pronounced in infants when compared to older children. It has been quoted to be around 71% of infants and approximately 43% in older children.<sup>5</sup> Atypical symptoms like inconsolable cry, irritability, should be paid attention especially in an infant and prompt diagnosis to be done at the earliest. Since it's not possible to have clear physical examination findings it is best to get the imaging studies to rule out the infection. Various differential diagnoses to be considered with these signs and symptoms are epiglottitis, foreign body aspiration, meningitis, and cervical lymphadenitis.<sup>2,7</sup>

The most common aetiology to cause RPA is considered to upper respiratory tract infection. In our study 58.8 % children had an episode of URTI before developing the RPA. One child had trauma to neck and one child had foreign body ingestion. 2 children were diagnosed as tuberculosis and had started on anti-tubercular treatment.

Imaging has to be done to confirm the diagnosis and know the extent of the disease. Though many modalities are available like lateral neck radiograph, CT and MRI. Correct extension of neck on full inspiration with adequate lateral orientation were must to detect any alterations in para or reteopharyngeal spcaes according to Haugh et al.<sup>8</sup> Since this is difficult to achieve in children, Nagy and Backstrom advise against using lateral neck x ray to diagnose the RPA.<sup>9</sup>

Though MRI is a noninvasive and safer option, it is not practical as it requires longer time to complete a study which requires sedation of the child and added higher



cost makes it less popular. CT has been considered as preferred diagnostic method in RPA after a survey conducted by the American society of pediatric otolaryngologists.<sup>10,11</sup> It has shorter scanning period, consistently better quality, lower cost and it is helpful in confirmation of the abscess, its extent and detects other possible complications. The sensitivity of CT for diagnosing RPA has been reported to be 88–91%<sup>12</sup>. All the children were subjected to CT neck and thorax at our institute.

When it comes to management of RPA both medical and surgical interventions are advocated. Few reserves surgical line to those who fail to resolve with former intervention. However, this amounts to a very small percentage of 20-25% cure.<sup>4</sup> Initial Antibiotics should be a broad spectrum until the pus culture sensitivity reports are available. Dawes L C et al recommend a combination of third generation cephalosporin, cloxacillin and metronidazole as initial antibiotic therapy.<sup>12</sup> We used 3<sup>rd</sup> generation cephalosporin and metronidazole for all the children initially and later changed.

Intra oral drainage and incision is the preferred route and external cervical approaches are reserved for very rare cases. We could drain the abscess in 16 of them via intra oral method. Using a long wide gauge spinal needle, it was easier to reach the abscess area.

Two children required external cervical approach. One to remove the foreign body which was embedded deep and another to drain the abscess which was at the level of T2 to T3 level. The pus which was drained was sent for culture sensitivity.

The most common pathogens isolated from deep neck spaces used to be *Staphylococcus aureus*, *streptococcus viridians*, *Klebsiella-pneumoniae*, *Escherichia coli*, beta-haemolytic *Streptococcus Group A*, and *Haemophilus* species.<sup>4</sup> Recently, MRSA has predominated as shown by one of the cohort studies conducted on 228 patients by Inman et al; between 1999 to 2007.<sup>13</sup> A case report by Pascu has also demonstrated the same in a 3-month-old infant.<sup>14</sup>

Poonith et al recommend that MRSA should be suspected etiology in newborns, infant and young

children.<sup>1</sup> Our study showed maximum number of staphylococcus (8) in which 5 were MRSA. It is interesting note that all these 5 children were under 1 year. In a study by Abdel-Haq N et al showed MRSA as a major pathogen of RPA. They suggested this change in trend to general increase of CA-MRSA infections in their pediatric population. Several virulence factors have been attributed to the invasiveness of CA-MRSA. The main factor appears to be the Pantone-Valentine leukocidin, a pore-forming exotoxin.<sup>15</sup>

Four children showed no growth. This included 2 patients who had started on anti-tubercular treatment in last one month. Both the children presented with multiple neck lymphadenopathy which was diagnosed as Tuberculosis and initiated on the ATT. After initial brief asymptomatic period, they presented with new onset of fever, dysphagia, and stridor.

A paradoxical reaction in tuberculosis (TB) is defined as the clinical or radiological worsening of the pre-existing tuberculous lesion or the development of a new lesion in a patient who initially improves with anti-tuberculosis therapy (ATT), in the absence of disease relapse. It can occur any time after 2 weeks of initiation of the treatment. Its incidence is said to be 11-15% of patients with TB. The culture yields no growth but responds well on continuation of the ATT and the temporary management of the presented symptoms.<sup>16-17</sup>

Retropharyngeal abscess can progress to cause complications like mediastinitis, aspiration, jugular vein thrombosis, carotid artery aneurysm, necrotizing fasciitis and vertebral body subluxation.<sup>2,4</sup> Five children showed complications in which one child had lung abscess, 2 had recurrent collection of RPA, one had IJV thrombosis with lung consolidation and one had subluxation of vertebral body. 60% of them were infants. This highlights the early surgical intervention for successful outcome as the crucial step in infants with RPA.

Poonith et al mentioned in case the child does not improve after initial incision and drainage, repeat CT to be considered to rule out any additional loculations which needs to be drained.<sup>1</sup> Which was found to be useful in two of our cases. Along with surgical treatment, the administration of prolonged antibiotics and airway

maintenance will avert the possible life-threatening complications.

### Conclusion

The crucial step in infants with RPA is prompt diagnosis and early surgical intervention for successful outcome. Along with surgical treatment administration of prolonged antibiotics and airway maintenance will avert the possible life-threatening complications. Emphasis has to be given to the recent trend is MRSA especially in younger children in order to start the IV antibiotics which covers all common pathogens. We need to make ourselves with the concept of paradoxical reaction of TB and treat accordingly.

### References

- Poonit ND, Zhou YY, Xu DF, Qiu XH, Chen YF, Li ZJ. RPA in Children: A Retrospective Study. *Ann Pediatr Res.* 2019; 3 (3);1027
- Singh I, Madan T, Rai A, Yadav A, Sivasankar R, Rajguru R, *et al.* RPA in a 3-month-old infant: A rare entity. *J Mar Med Soc* Volume XX| Issue XX| Month. 2020:2
- Gehlawat VK, Mittal K, Arya V. RPA in neonate-A misdiagnosed entity. *Journal of Pediatric Critical Care.* 2018 Jul 1;5(4):53
- Halawani RT, Abosharyah B. RPA rare presentation in a 11 months old infant: a case report. *Int J Otorhinolaryngol Head Neck Surg* 2017;3:443-5
- Alyono JC, Koltai PJ. Neonatal RPA with complications: Apnea and cervical osteomyelitis. *International journal of pediatric otorhinolaryngology.* 2019 Nov 1;126:109613
- Huang CM, Huang FL, Chien YL, Chen PY. Deep neck infections in children. *Journal of microbiology, immunology and infection.* 2017 Oct 1;50(5):627-33
- Perumal S. An Acute Stridor In An Infant-A case report. *University Journal of Medicine and Medical Specialities.* 2017 Apr 13;3(3)
- Haug RH, Wible RT, Lieberman J. Measurement standards for the prevertebral region in the lateral soft-tissue radiograph of the neck. *Journal of oral and maxillofacial surgery.* 1991 Nov 1;49(11):1149-51
- Nagy M, Backstrom J. Comparison of the sensitivity of lateral neck radiographs and computed tomography scanning in pediatric deep neck infections. *The Laryngoscope.* 1999 May;109(5):775-9
- M. Lalakea, A. Messner, RPA management in children: current practices, *Otolaryngol. Head Neck Surg.* 121 (1999) 398–405.10.1016/S0194-5998(99)70228-7
- Al-Sabah B, Bin Salleen H, Hagr A, Choi-Rosen J, Manoukian JJ, Tewfik TL. RPA in children: 10-year study. *Journal of otolaryngology.* 2004 Dec 1;33(6):352-5
- Dawes LC, Bova R, Carter P. Retropharyngeal abscess in children. *ANZ journal of surgery.* 2002 Jun;72(6):417-20
- Inman JC, Rowe M, Ghostine M, Fleck T. Pediatric neck abscesses: changing organisms and empiric therapies. *Laryngoscope.* 2008;118(12):2111-4
- Falup-Pecurariu O, Leibovitz E, Pascu C, Falup-Pecurariu C. Bacteremic methicillin-resistant *Staphylococcus aureus* deep neck abscess in a newborn—case report and review of literature. *Int J Pediatr Otorhinolaryngol.* 2009;73(12):1824-7
- Abdel-Haq N, Quezada M, Asmar BI. Retropharyngeal Abscess in Children: The Rising Incidence of Methicillin-Resistant: *Staphylococcus aureus.* *The Pediatric infectious disease journal.* 2012 Jul 1;31(7):696-9
- Shah I, Chilkar S, Patil M, Ali U. Acute respiratory distress during paradoxical reaction to antituberculous therapy in an 8-month-old child. *Lung India* 2012;29:381-3
- Desai L, Shah I, Shaan M. Retropharyngeal abscess as a paradoxical reaction in a child with multi-drug-resistant tuberculosis. *Paediatrics and International Child Health.* 2019 Oct 2;39(4):287-9.