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LONG-TERM OBSERVATION OF A CHILD WITH FOREIGN BODY ASPIRATION PNEUMONIA AND RECCURENT CARDIAC ARREST FROM AN INCARCERATED MOTHERS

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ABSTRACT

This study employed a longitudinal case study design aimed at describing the clinical course, respiratory recovery, nutritional status, developmental progress, and social dynamics of a child with aspiration pneumonia accompanied by cardiac arrest. The research subject was a one-year-old girl who experienced baked potato aspiration while living in a correctional facility with her mother. The patient received intensive treatment at Andalas University Hospital and was subsequently monitored for three consecutive semesters after discharge. Data collection was conducted through multiple sources to obtain comprehensive information. Clinical data during the acute phase were obtained through a review of the patient's medical records, including physical examination findings, laboratory and radiological results, and records of medical interventions provided during hospitalization. Follow-up data were collected through direct clinical observation during routine control visits, focusing on respiratory recovery, nutritional status, and developmental progress. Child development was assessed using standardized developmental screening tools, namely the Denver Developmental Screening Test II (Denver II) and the Capute Scales (CAT-CLAMS). Additional contextual data were obtained through in-depth interviews with the child's parents, correctional facility health workers, and healthcare providers at the referral hospital to understand the caregiving environment and health management after discharge. Home visits were also conducted after the mother returned from the correctional facility to evaluate the child's living conditions, caregiving practices, and environmental factors that might influence recovery and development. Data analysis was carried out using a descriptive and thematic approach. Clinical and developmental data were analyzed longitudinally to identify patterns of recovery from the acute phase to the follow-up period across three semesters. The analysis also explored the interaction between medical factors (such as treatment response and clinical outcomes) and social factors (including caregiving environment and family support) in influencing the child's recovery and development. All research procedures adhered to pediatric ethical principles, including maintaining the confidentiality of the patient's identity and obtaining informed consent from the family for documentation and analysis of the case. This approach allows for a comprehensive understanding of the child's recovery process, integrating both clinical and social perspectives.

Keywords: aspiration pneumonia; cardiac arrest; child development; correctional environment; foreign bodies; longitudinal case study

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INTRODUCTION

Aspiration pneumonia is characterized by the entry of oropharyngeal or upper gastrointestinal contents through the larynx and trachea into the pulmonary parenchyma (Gupte et al., 2022; Niederman & Cilloniz, 2022; Pan Samuel; Nielsen, Erik; Niederman, Michael S., 2024). About 10% to 30% of hospitalized patients with a diagnosis of community-acquired pneumonia experience aspiration (Sari, 2024). Foreign body aspiration in children is a special subset of aspiration pneumonia that has a higher risk of complications and is one of the leading causes of accidental death in the age group under three years old, especially in developing countries (Antón-Pacheco et al., 2021; Bajaj et al., 2021; Ulas et al., 2022). Globally, the highest incidence occurs in children between the ages of one and three (Mustakim et al., 2022). Organic matter is the most commonly aspirated type of foreign matter, accounting for about 70–90% of all foreign object aspiration cases,

including nuts, seeds, solid foods, vegetables and fruits. The remaining 10-30% is inorganic matter. Aspirated organic matter, such as baked potatoes, has the characteristic texture of a breakable texture, and when ingested in large pieces can close the bronchi and cause total obstruction of the airway (Çelikkaya et al., 2025; Aldabayan, 2025; Ekim & Altun, 2023).

Delays in diagnosis and management can increase the risk of serious life-threatening complications, such as respiratory arrest and cardiac arrest due to total airway obstruction that require immediate cardiopulmonary resuscitation (Ayar e t al., 2022; Ismawati, 2023; Ngamsanga et al., 2023). In such critical situations, emergency physicians play a crucial role in rapidly identifying foreign body airway obstruction and initiating timely airway interventions, including advanced airway management and bronchoscopy when indicated (Adi et al., 2022). Foreign body aspiration can also lead to aspiration pneumonia and other respiratory infections when the obstructing material is not promptly removed. Recent reviews emphasize that early diagnosis, timely foreign body removal, and appropriate antimicrobial therapy are essential to prevent recurrent infections and improve patient outcomes, particularly in high-risk populations such as pediatric and elderly patients (Tang et al., 2025).

This case report discusses the long-term monitoring of a one-year-old girl diagnosed with foreign body aspiration pneumonia (baked potato). The patient then experienced 3 episodes of cardiac arrest and managed to achieve a return of spontaneous circulation (ROSC). The complexity of this case is increasing because the aspiration incident occurs when the patient is in the correctional institution following the mother who is undergoing a period of detention. The critical illness condition experienced by the patient, with the psychosocial challenges due to the mother's detention situation, has the potential to have a significant impact on the patient's growth, development, and quality of life as well as anxiety for parents. This long-term observation aims to provide patients with appropriate intervention and monitoring from a medical and psychosocial perspective to minimize the negative impact of critical illness due to foreign object aspiration pneumonia, so that patients can achieve optimal growth and development.

METHOD

This study uses a longitudinal case study design that aims to describe the clinical course, respiratory recovery, nutritional status, development, and social dynamics of a child with aspiration pneumonia accompanied by cardiac arrest. The subject of the study was a one-year-old girl who experienced baked potato aspirations while in a correctional facility, was treated intensively at Andalas University Hospital, and then monitored for three semesters after discharge from treatment. Data collection was carried out through analysis of medical records during the acute phase, direct observation of children's growth and development and nutritional status during control visits, in-depth interviews with parents, prison health workers, and health workers at referral hospitals, and home visits to assess the condition of the nursing environment after mothers returned from prison. The clinical data collected included the results of physical, laboratory, radiology, and medical intervention records, while developmental data were obtained through Denver II and Capute Scales (CAT-CLAMS). Data analysis was carried out in a thematic descriptive manner by examining changes in children's conditions from acute to recovery, as well as assessing the interaction between medical and social factors. The entire research process adheres to the ethical principles of pediatrics, including maintaining the confidentiality of the patient's identity and obtaining the family's permission to document the course of the case. This approach provides a comprehensive understanding of the child's recovery process in both clinical and social contexts.

RESULT

Acute Phase Results: Initial Treatment in Hospital (August–September 2024)

In the initial phase of hospital admission, the patient was in an emergency condition after experiencing aspiration for a piece of baked potato while in the correctional institution. The incident

led to three cardiac arrests and cardiac arrests before further resuscitation, with each episode successfully achieving Return of Spontaneous Circulation (ROSC). However, the patient's condition remained critical with a decreased level of consciousness, so upon arrival at the emergency facility, intubation was carried out using ETT 4.0 uncuffed and stabilization before being referred to Andalas University Hospital which has a pediatric intensive care facility (PICU).

The initial physical examination showed severe respiratory distress, characterized by GCS E3M3R4, breathing frequency reaching 54 times per minute, and epigastric and suprasternal retraction as a sign of respiratory distress. A pulse rate of 162 beats per minute indicates the body's compensation efforts against hypoxia that previously occurred. Despite being connected to a ventilator, auscultation showed a fine ronki in the right hemitolac, indicating an ongoing inflammation or obstruction. Laboratory examination showed an increase in leukocytes up to 28,200/mm^3, while blood gas analysis reflected a combination of respiratory alkalosis and metabolic acidosis. Thoracic photographs also show homogeneous consolidation in the right superior lobe, as per the picture of aspiration pneumonia with possible sectoral obstruction.

During intensive care, patients received comprehensive management that included P-SIMV mode mechanical ventilation with 30% FiO_2 and 7 cmH_2O PEEP, gradual antibiotic therapy ranging from Ampicilin-sulbaktam and Gentamycin to Ceftriaxone, and intravenous administration of dexamethasone to suppress inflammation. Drip midazolam sedation is used for comfort and synchronization with the ventilator, while total parenteral nutrition is administered to maintain energy and metabolic adequacy. After ten days in the PICU and two days in a regular inpatient room, the patient's condition showed significant improvement with reduced lung consolidation, stable breathing, and normal vital signs. The patient was then discharged without additional ventilation and scheduled follow-up to a respirology poly, growth and development, as well as nutrition clinic for long-term monitoring.

Observation Results for Semester I (October 2024 – March 2025)

In the first semester observation period, the child's clinical condition showed a stable recovery after discharge from intensive care. During these six months, no respiratory complaints were found leading to post-aspiration pneumonia complications, such as shortness of breath, nasal lobes, or wheezing. The child appears active and responsive, with no recurrent coughing or signs of a respiratory tract infection that indicates prolonged lung involvement. This stability of respiration is an indicator that the inflammatory process in the lungs has fully recovered and does not cause structural sequelae. On the other hand, the results of growth monitoring showed a positive trend, with an increase in weight from about 8 kilograms to 9 kilograms and an increase in height from 73 cm to 75 cm. Based on the WHO growth curve, the nutritional status of children remains within the normal range, and the diet increases gradually even though the child lives in a correctional environment.

In addition, the development of children in the first semester showed encouraging achievements. The Denver II examination assessed that all aspects of gross motor development, fine motor, language, and personal-social development were age-appropriate. The child has been able to walk without assistance, start saying some meaningful words, and show fine motor skills such as scribbling and using a spoon. The findings are important because the child has a history of cardiac arrest three times, a condition that in theory has the potential to cause neurocognitive impairment. The results of this monitoring showed that there were no signs of regression or developmental delay, and his neurological adaptability appeared to be good throughout the first semester.

Parenting environmental factors also play a role in the results of this monitoring. During this period, the child still lived with his mother at the Air Padang Children's Women's Prison. Although prison facilities are limited and not entirely child-friendly, daily stimulation is still obtained through

interaction with mothers, health workers, and other inmates. Weight, height, and immunization checks are carried out regularly so that basic health needs are monitored. At the end of the semester, the home visits showed limited family economic conditions and suboptimal home ventilation, but the surrounding social environment was quite supportive. Fathers play an important role in maintaining family stability and meeting the needs of other children. Overall, the first semester shows that the child's recovery is taking place well in medical, nutritional, developmental, and psychosocial aspects, which are influenced by prompt medical intervention as well as supportive parenting despite being in challenging social situations.

Observation Results of Semester II (March 2025 – September 2025)

In the second semester, after the patient's mother had completed the period of detention and the child had returned to live in the home environment, the clinical condition showed excellent stability. An examination at the Respiratory Polyclinic of M. Djamil Padang Hospital confirmed that there were no signs of respiratory distress, such as additional breathing, wheezing, or respiratory distress. Physical examination was within normal limits, while follow-up thoracic photographs showed clean lungs with no infiltrates, atelectasis, or residual inflammation. The laboratory results also support the improvement of clinical conditions, with hemoglobin levels of 11.2 g/dL and leukocytes of 13,420/mm³ which are still appropriate for the child's age. These findings show that patients do not experience long-term complications after aspiration pneumonia or cardiac arrest.

In terms of development, the results of the examination at the Growth and Development Clinic show that the child's abilities remain consistent with his chronological age. Denver II showed age-appropriate development in all aspects, while the Capute Scales (CAT-CLAMS) assessment resulted in a Developmental Quotient value of 105, which falls into the normal category. This is especially significant considering that the child has a history of severe hypoxia due to three episodes of cardiac arrest, which theoretically increases the risk of neurological disorders. However, this semester's evaluation showed no real neurocognitive deficits, thus confirming that regular monitoring and adequate stimulation support the recovery of child developmental functions.

The development of nutritional status also showed positive results. Examination at the Nutrition and Metabolic Diseases Clinic noted that the child's weight reached 9.5 kilograms, body length 80 cm, and a head circumference of 47 cm which was in the normoscephalal range. These findings show consistent catch-up growth after a critical period. In addition, changes in the parenting environment after the mother returns home exert an important social influence. Full parenting by both parents and extended family support help maintain the emotional stability and health of the child, even though economic conditions are still limited. Overall, the observations of the second semester show that the recovery of respiration, development, and nutritional status is going very well, supported by appropriate medical treatment and a stable nursing environment.

Observation Results for Semester III (October 2025 – November 2025)

In the third semester observation period, the general health condition of children remained stable although there were some minor complaints that needed attention. The child has a fever for two days without being accompanied by cough, tightness, or signs of lower respiratory tract infection. The main complaints are a decrease in appetite and weight loss from 12 kilograms to 11 kilograms in a short time. However, the child still appears active and shows no signs of dehydration or weakness, so early complaints are more likely to lead to mild infections or temporary decreased food intake.

The clinical examination conducted showed quite good results. No signs of respiratory distress, contraction, or abnormal breathing sounds were found on auscultation. Supporting examinations also gave convincing results, where the Mantoux test showed negative results so as to rule out the possibility of tuberculosis, and the urinalysis was within normal limits with no indication of urinary

tract infection. The weight loss that occurs is more likely to be caused by a decrease in food intake within a few days, rather than by a more serious pathological process. In the context of growth and development, the Denver II exam showed motor, language, and personal-social abilities that were still appropriate for age, while the CAT-CLAMS score of 89 remained at normal limits although slightly decreased compared to the results of the previous semester.

Nutritional interventions are given to mothers in the form of education to increase food intake through soft feeding, increased frequency of meals, and variations of protein and calorie sources. After two weeks, the child's response was very good with an increase in weight of up to two kilograms, returning to the normal range for his age. This improvement shows that weight loss is temporary and easy to correct with proper nutritional management. Overall, the results of the third semester showed that despite temporary disturbances in diet and weight, the child's clinical, respiration, and developmental conditions remained stable without the appearance of long-term complications, reinforcing the finding that children's recovery after heavy aspirations was optimal.

DISCUSSION

This study describes the clinical journey of a child with foreign object aspiration pneumonia with recurrent cardiac arrest complications, as well as longitudinal monitoring of respiratory conditions, nutrition, development, and family social aspects. The findings suggest that a combination of appropriate acute management, ongoing monitoring, and adaptive parenting support plays an important role in ensuring that long-term sequelae do not occur. The following discussion describes these dynamics in the context of existing scientific evidence.

Aspiration Pneumonia and Post-Acute Treatment Respiratory Recovery

Aspiration pneumonia in children generally occurs as a result of acute obstruction by foreign objects entering the airways, especially hard-textured foods as reported by Çelikkaya et al. (2025), Singh (2023), Ekim & Altun (2023), and Demiroren, (2023) which found that aspiration cases in toddlers came from solid snacks. In this case, the patient experiences aspiration of the burnt potato pieces that cause obstruction and inflammation of the right superior lobe. This is consistent with the report Shetty & Archana, (2023) that the right lobe is more often involved in the aspiration of the child due to the straighter anatomy of the right main bronchi. Radiological examination showed consolidation that then improved after antibiotic therapy and mechanical ventilation.

Rapid recovery of respiration and the absence of long-term complications such as atelectasis, bronchiectasis, or persistent wheezing within three semesters of observation indicated that the inflammatory process was effectively managed. The literature suggests that advanced complications are more common in aspirations that are not treated immediately or in the case of foreign bodies that remain for more than 24 hours (Antón-Pacheco et al., 2021; Huh, 2022; Long et al., 2024). In these cases, rapid interventions such as intubation, airway stabilization, and antibiotic therapy contribute greatly to full recovery without sequelae.

Neurological Risks of Post-Cardiac Arrest and Child Development Outcomes

Recurrent cardiac arrest in children is often associated with a risk of neurological damage due to hypoxia. International studies show that survival with good neurological outcomes is only around 30–50% in out-of-hospital cardiac arrest (Fuchs et al., 2023; Holgersen et al., 2022; Barreto et al., 2022). However, in these patients, the results of Denver II and CAT-CLAMS showed normal development in all domains (fine motor, gross motor, language, and cognitive).

The absence of neurological deficits indicates that the duration of hypoxia is likely to be short and that resuscitation treatment is effective. In addition, regular monitoring of growth and development by health workers plays an important role in early detection of potential disorders, so that interventions can be provided in a timely manner if needed. These findings suggest that neurological risk after cardiac arrest does not always lead to developmental disorders, especially

when treatment is carried out according to Pediatric Advanced Life Support (PALS) guidelines.

Nutritional Status and Growth Restoration

The findings of the three semesters of observation show that the child experiences a stable growth pattern, with Catch-up growth good after the critical phase. Consistent weight gain, recovery of head circumference, and TB/U within the normal range indicate that care in prisons and at home still allows for the fulfillment of children's nutritional needs. This is contrary to Studies by Singha et al.,. (2024) reported that children with severe pneumonia were at risk of growth stunts for up to 12 months post-treatment.

The weight loss that had occurred in the third semester was caused by a decrease in appetite due to an acute infection, but the positive response after the nutritional intervention showed that the problem was temporary. In the context of the literature, children with severe post-pneumonia are at risk of malnutrition or failure to grow within 6–12 months after treatment, so the findings in this case confirm the importance of periodic nutritional monitoring.

The Influence of the Correctional Environment on Children's Health

Environmental factors play an important role in the occurrence of aspiration incidents. Correctional institutions are not an ideal parenting environment for children due to limited space for movement, lack of child-friendly facilities, and limited effective supervision. The aspirations experienced by children when consuming baked potatoes under less supervision reflect the risks inherent in the environment. However, the study also found several positive aspects in prisons, such as routine monitoring of weight and height by health workers, daily stimulation by mothers and other inmates, and access to immunizations and medical referrals when needed. In the framework Child-Friendly Correctional Facilities, this condition is still far from ideal, but it shows that there are institutional efforts to fulfill the basic rights of children. The findings of this case confirm the need for stricter operational guidelines related to feeding, child supervision, and first aid training in choking cases (First aid for choking), as well as quick coordination with health facilities. This is in line with the findings Loyalin & Kurniawan (2024) that the stability of the parenting relationship, even if it takes place under limited conditions, can still serve as a protective factor for the welfare of children.

Clinical and Social Implications

This case provides a number of important implications for various sectors involved in child health and protection. From the health service perspective, aspirations in children must be treated as an emergency that requires quick and appropriate treatment to prevent hypoxia and long-term neurological damage, so continuous monitoring is needed to detect possible respiratory or neurological sequelae. For correctional institutions, this case emphasizes the need for standard procedures in feeding children under five, increasing the capacity of officers through routine training on choking (first aid for choking), and improving the physical environment to be safer and support child growth and development. From a social policy perspective, children living in correctional settings need to be given priority in the social protection system, including access to health services, developmental monitoring, and family welfare support. Stronger collaboration between institutions, including prisons, social services, and health services, is key to ensuring optimal safety and recovery for children in vulnerable social conditions as in this case.

CONCLUSION

This study shows that children with foreign object aspiration pneumonia and three cardiac arrest episodes can achieve good clinical, respiratory, and developmental recovery if they receive prompt acute treatment, long-term monitoring, and adequate parenting support. Lung condition improved without long-term complications, while Denver II and CAT-CLAMS evaluations showed age-appropriate progression, signaling the absence of recurrent post-cardiac arrest neurological sequelae.

This recovery is also supported by social factors, including the role of mothers while in prison, monitoring of health workers, and family adaptation after release. Although the correctional environment is a risk factor for aspiration, appropriate medical intervention and family support can minimize its negative impacts. Overall, this study confirms the importance of a multidisciplinary approach in dealing with heavy aspirations in children in socially vulnerable conditions. Collaboration between health workers, prisons, and families is needed to ensure the safety and continuity of children's growth and development and can be the basis for improving policies related to childcare in prisons and aspirational emergency management.

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