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A Case Report of Bronchial Asthma in a 56-Year-Old Mother With the Main Complaint of Shortness of Breath in the Emergency Room

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ABSTRACT
Asthma is a chronic disease that affects many children and adults in both developed and developing countries. According to WHO data, around 300 million people in the world have asthma, and it is estimated that this will continue to increase to reach 400 million in 2025. This research aims to explain the definition, etiopathology, clinical symptoms and signs, diagnosis, and appropriate, fast and accurate management of "Bronchial Asthma" so that correct treatment, good prognosis and patient safety are guaranteed. This type of research is a case study or a case report of a 56-year-old mother with bronchial asthma. A 56-year-old mother with Bronchial Asthma came consciously to the emergency room RSUD Gerung with complaints of shortness of breath. Shortness of breath has been felt since yesterday. The shortness of breath began with a cough had been experienced since 3 days of SMRS, which worsened yesterday. Phlegmy cough with phlegm that is difficult to expel. Now, the phlegm can start to be released little by little in a white color. Physical examination results: Consciousness (KU): Moderate, CM, BP: 110/70 mmHg, HR: 76 x/i, regular, RR: 36 x/i, T: 37oC, SpO2: 91-92% (room air). Head: Eyes: conjunctiva palpebra: anemic: (-/-), icteric: (-/-), pupil: isocoric, diameter: 3 mm, RCL +/+, RCTL +/+. Palpation: Strong cardiac impulse lift (+). Percussion: No apparent cardiac enlargement. Auscultation: HS I-II normal intensity, regular, murmur (-). Pulmo: Inspection: Expansion of the right chest = left, Palpation: Tactile fremitus in the left chest = right. Sonor percussion. Auscultation: Vesicular Ronchi +, Wheezing +. Auscultation: bowel sounds (+) normal. Chest X-ray Results In asthma, 75% of chest X-rays show a normal appearance. Findings that can be found in asthma patients include pulmonary hyperinflation. Thickening of the bronchial walls: peribronchial cuffing (nonspecific finding, but occurs in 48% of asthma cases). Pulmonary edema (rare), pulmonary edema due to asthma (typically seen in acute asthma attacks), cardiomegaly and bronchopneumonia.

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INTRODUCTION

Asthma is a chronic disease affecting many children and adults in developed and developing countries. According to WHO data, around 300 million people in the world

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have asthma and it is estimated that this willcontinue to increase to reach 400 million in 2025. Even with effective treatment, asthma morbidity and mortality rates remain high. One in 250 people who die is an asthma sufferer (Ratnawati, 2011). The mortality rate for asthma in the world reaches 17.4% and this disease is ranked among the top 5 causes of death (Sihombing et al., 2010)

Asthma is a chronic inflammatory disorder of the airways. This causes increased airway hyperresponsiveness characterized by wheezing, difficulty breathing, chest tightness, and coughing, especially at night or in the early morning. Asthma is an intermittent and reversible airflow disorder that only affects the airways, not the alveoli. Airflow disturbances occur in two ways, namely inflammation and airway hyperresponsiveness. Inflammation occurs in the lumen (inside) of the airway. Airway hyperresponsiveness occurs due to soft constriction of the bronchial muscles taht cause the airway to narrow outwards(Rosfadilla & Sari, 2022)

Asthma is a health problem worldwide, both in developed and developing countries. Currently, asthma has also become familiar in society. Asthma can be suffered by all levels of society from children to adults. Asthma was initially considered a genetic disease inherited from parents to their children. However, lately, genetics is not the main cause of asthma. Air pollution and lack of environmental cleanliness in urban areas are dominant factors in the increase of asthma attacks(PDIP, 2019)

WHO and the Global Asthma Network (GAN), an asthma organization in the world, predict that by 2025 there will be an increase in the asthma population of 400 million and there will be 250 thousand due to this disease (WHO, 2022). Based on data from the Ministry of Health in 2020, asthma is one of the most common types of disease suffered by Indonesian people until the end of 2020. The number of people living with asthma in Indonesia is around 4.5 percent of the total population of Indonesia or around 12 million more. Based on asthma prevalence data, according to the World Health Organization (WHO) in 2019, there were around 235 million asthma sufferers or 1% - 18% of the world's population(Kementerian kesehatan RI, 2021;GINA, 2019)

Based on Riskesdas data in 2018, from 2015 to 2017, the prevalence of hospitalized people with asthma in Indonesia in the 45-64 year age group was 27.6% -29.3%. Meanwhile, the lowest prevalence was in the 7-28 year age group at 0.3%. Long-term risks in patients with uncontrolled asthma include asthma attacks, developmental disorders or accelerated decline in lung function, and side effects from treatment (Riskesdas, 2018)

The increase in the prevalence of people with bronchial asthma is caused by air pollution (industry, motor vehicles, forest burning, etc.). The lifestyle of obese people, allergens in the house such as mites, house dust, and animal dander, and allergens outside the house such as cigarettes, pollen, and mold spores also influence it. Insufficient family knowledge regarding the disease condition and treatment of Asthma patients has increased the number of patients (Tandi, 2018;Istyanto & Virgianti, 2023)

Asthma inflammation differs from other airway inflammatory diseases, asthmatic inflammation is inflammation with impaired eosinophil airway infiltration. Eosinophils have been proven to be the main inflammation in asthma after allergen inhalation, with an

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increase in eosinophils found in bronchoalveolar fluid during a late asthma reaction accompanied by inflammation(Fachri & Tajudin, 2017; Hendry et al., 2022; Pramesti & Prastudia Eko Binuko, 2022)

Asthma attacks are caused by allergens, viruses, and irritants that induce an acute inflammatory response. Asthma occurs in 2 pathways, which are immunological and autonomic nervous. The immunological pathway is dominated by IgE antibodies representing a type 1 hypersensitivity reaction (allergic-type) consisting of both fast and slow phase. Allergic reactions occur in people with a tendency to form large amounts of abnormal IgE antibodies, this is called atopy. IgE antibodies in allergies attach to the surface of pulmonary intestinal mast cells, which are associated with bronchioles and small bronchi(Khusna & Saroh, 2022)

According toKhusna & Saroh (2022) , The classic triad of asthma symptoms is shortness of breath, wheezing, and coughing. Other symptoms include chest pain, sputum, weakness, sore throat, runny nose, and sneezing. Symptoms vary according to time, intensity, and severity. Symptoms are influenced by trigger factors such as exposure to allergens, cold air, respiratory tract infections, medications, and physical activity. Social factors influence the emergence of asthma attacks, such as home, smoking, place of work, school, level of education, or employment (Harjuansa & Binoriang, 2023)

So, it is also important for doctors to know and analyze the type of asthma and the causes of asthma experienced by the patient, the right analysis will produce the right study so that the diagnosis is made correctly and the patient can get the right service and drug therapy too. This study aims to explain the definition, etiopathology, clinical symptoms and signs, diagnosis, and appropriate, fast, and accurate management of "Bronchial Asthma" so that correct treatment, good prognosis, and patient safety are guaranteed.

METHODS

This type of research is a case study or a case report of a 56-year-old mother with bronchial asthma. A 56-year-old mother with Bronchial Asthma came consciously to the emergency room RSUD Gerung with complaints of shortness of breath. Shortness of breath has been felt since yesterday. The shortness of breath began with a cough experienced since 3 days of SMRS, which worsened yesterday. Phlegmy cough with phlegm that is difficult to expel. Now, the phlegm can start to be released little by little in a white color.

RESULTS AND DISCUSSION

Results

The 56 years old patient with Bronchial Asthma, female, working as a housewife, had the main complaint of shortness of breath. The patient came consciously to the emergency room at RSUD P3 with complaints of shortness of breath. Shortness of breath has been felt since yesterday (18/12/2022, and has been worsening since last night when the patient went to sleep. The shortness of breath is felt accompanied by a "ngik-ngik" sound (stridor), and the patient has difficulty breathing so the patient cannot sleep. When examined, the

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patient is more comfortable sitting bent over than lying down. The patient answers questions word for word.

The shortness of breath began with a cough that had been experienced since 3 days of SMRS, which worsened yesterday. Phlegmy cough with phlegm that is difficult to expel. Now, the phlegm can be released little by little in white color. The patient denied coughing up blood. Other complaints, such as fever, coughing up blood, night sweats, weight loss, and nausea and vomiting, were denied by the patient. Chest pain denied. Cold sweat denied. Pain when inhaling is denied. There are no complaints about defecation and urination, and they are within normal limits.

Past Medical History

The patient has frequently experienced similar symptoms before. Shortness of breath like the current episode was first felt approximately 20 years ago, and the patient has often sought treatment at healthcare facilities. When experiencing the same complaint, the patient only takes medication obtained from the community health center and the symptoms diminish. The patient forgets the name of the medication.

Initially, these complaints were infrequent for the patient, but in recent years, exacerbations have become more frequent, occurring 4-5 times a month at night and occasionally during the day, although not every day. History of runny nose and itching when exposed to cold weather. Drug allergies are denied, as are food allergies.

The patient's mother has a history of complaints similar to the patient's. Family history of food allergies, rhinitis, and atopic dermatitis is unknown. History of smoking is denied. The patient forgets the name of the medication.

Physical examination results consciousness (KU): Moderate, CM, BP: 110/70 mmHg, HR: 76 x/i, regular, RR: 36 x/i, T: 37oC, SpO_2: 91-92% (room air). Head: Eyes: conjunctiva palpebral: anemic: (-/-), icteric: (-/-), pupil: isocoric, diameter: 3 mm, RCL +/+, RCTL +/+. Nose, ears, mouth: secretion (-/-), hyperemia (-/-), Tonsils T1-T1, pharynx hyperemia (-), nasal flaring (-). Neck: lymph node enlargement: (-), trachea position: medial, Cor: Inspection: Ictus cordis is not visible. Palpation: Strong cardiac impulse lift (+). Percussion: No apparent cardiac enlargement. Auscultation: HS I-II normal intensity, regular, murmur (-). Pulmo: Inspection: Expansion of the right chest = left, Palpation: Tactile fremitus in the left chest = right. Sonor percussion. Auscultation: Vesicular Ronchi +, Wheezing +.

Abdomen: Inspection: Chest wall in alignment with abdominal wall, distention (-), use of abdominal muscles (-). Palpation: tender, tenderness(-), liver and spleen not palpable. Percussion: tympanic, undulation test (-), referred deafness (-) Auscultation: bowel sounds (+) normal. Extremities: Warm acral, pretibial edema (-/-), cyanosis (-).

Examination Results

The results of the chest X-ray examination can be seen in the following image:

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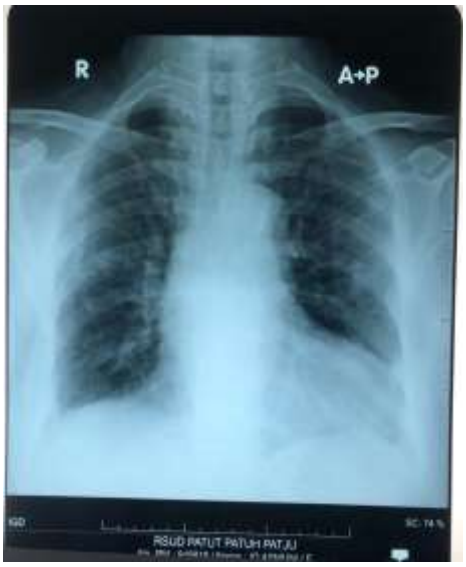


Picture 1. chest X-ray

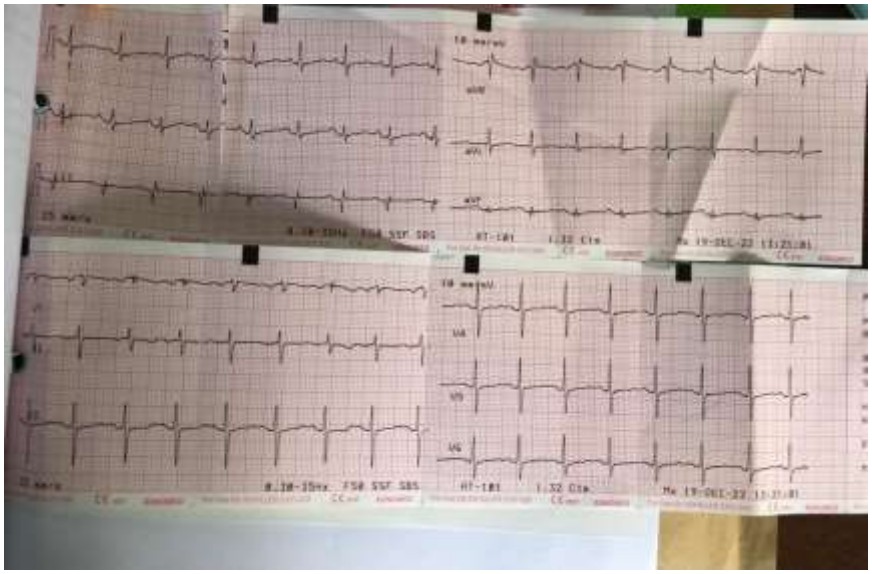
Interpretation of chest X-ray:

- Cardiomegaly
- Infiltrates in the middle to lower fields of both lungs → picture of bronchopneumonia

Electrocardiogram (EKG) examination

The results of the EKG examination data are seen in the following image:

- Normal Sinus Rhythm



Picture 2. Electrocardiogram (EKG) Result

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Diagnosis

- Acute exacerbation of severe asthma attack
- LRTI (Lower Respiratory Tract Infection)

Therapy

- Bed rest
- IVFD RL 20 TPM
- Budesma nebul 2-1-1 during the 1st hour, followed by maintenance 2x1 respul
- Lasalcom nebul 1-1-1 during the 1st hour, followed by maintenance 4x1 respul
- Inj Lefofloxacin 1x750mg IV
- Inj Methylprednisolone 3x30mg IV
- N-Ace 3x200mg PO
- Paracetamol 3x500mg PO

Discussion

Asthma is a chronic disease, typically experienced by patients since a young age, especially in childhood. Patients with acute asthma attacks usually have a triad of clinical symptoms, that is shortness of breath, coughing, and wheezing. Other symptoms that can be experienced include chest tightness, sputum production, decreased work tolerance, sore throat, and if the patient also suffers from rhinitis or atopic dermatitis, symptoms of a runny nose or body rash may also occure. Asthma is also a hereditary disease, usually someone in the family has asthma, or rhinitis and atopic dermatitis. Other symptoms can include chest tightness, sputum production, decreased work tolerance, sore throat, and in allergic asthma accompanied by a runny nose or sneezing. Symptoms also occur if there are triggering factors, such as cold air, respiratory tract infections, drugs, mites, cigarette smoke, physical activity, and other triggers.

The patient has been suffering from asthma for approximately 20 years. Symptoms that patients complain of include shortness of breath, wheezing, and productive cough.The patient denied any history of allergies. The patient has no history of allergic rhinitis or atopic dermatitis, but the patient's mother also has asthma.

On physical examination, tachypnea, wheezing, pursed-lip, and the use of chest and abdominal muscles are often found. In the patient, RR 36x/i, S1S2 (+) reg, murmur (-), gallop (-), vesicular breath sounds, additional wheezing sounds in both lung fields, sonor percussion in both lung fields, normal tactile fremitus in both lung fields, soft abdomen, liver, spleen, kidneys not palpable, warm acral, no pretibial edema.

According to Rosfadilla & Sari (2022) physical examination showed the impression of dyspnea and wheezing sounds during the initial phase of exhalation in both lung fields. Dyspnea tends to vary, depending on the severity of expiratory airflow obstruction. Wheezing, most commonly encountered during an acute asthma attack, is the term used to describe the sound produced due to gas flow turbulence through narrow airways. Airway narrowing in asthma is a complex phenomenon. This occurs due to the release of mediators from mast cells found abundantly on the bronchial mucosa surface, airway lumen, and beneath the basement membrane. In asthma symptoms, such as short coughing and

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wheezing are the result of bronchial obstruction caused by chronic inflammation and bronchial hyperactivity.

Examination of vital signs revealed the patient to be in moderate distress with apparent dyspnea,, compos mentis consciousness, temperature 37.2°C, heart rate 94 times/minute, respiratory rate 28 times/minute, and oxygen saturation 97%. In generalized status, normocephalic head examination, eyes, ears, nose, impressions are within normal limits, lips are not cyanotic. On chest examination, there were intercostal retractions, rapid chest wall movement, symmetrical tactile fremitus on both right and left, Sonor percussion in both lung fields; auscultation heard vesicular sounds in both lung fields accompanied by wheezing at the end of expiration, and rhonchi in both lung fields. Cardiac examination revealed normal heart borders, heart sound I and heart sound II are regular, no additional heart sounds. Flat abdomen, bowel sounds 8 times/minute, no tenderness and organomegaly, tympanic percussion. There is no edema in the extremities, no cyanosis, CRT of less than 2 seconds, a normal impression (Khusna & Saroh, 2022)

Chest X-ray Results In asthma, 75% of chest X-rays show a normal appearance. Findings that can be found in asthma patients include pulmonary hyperinflation. Thickening of the bronchial walls: peribronchial cuffing (nonspecific finding, but occurs in 48% of asthma cases). Pulmonary edema (rare), pulmonary edema due to asthma (typically seen in acute asthma attacks), cardiomegaly and bronchopneumonia(Pahlawi & Sativani, 2021; Pramesti & Prastudia Eko Binuko, 2022; Tarigan, 2022).

Asthma is a chronic inflammatory disorder of the airways with various cells playing a role, especially mast cells, eosinophils, and T lymphocytes. In individuals who are susceptible to inflammation, it results in symptoms of repeated episodes of wheezing, shortness of breath, chest tightness, and cough, especially at night or early morning. These symptoms are associated with extensive and variable airway obstruction partially reversible spontaneously or with treatment. The immunopathophysiology of asthma involves activation of both innate and adaptive immune systems to stimulate chronic airway inflammation. Chronic airway inflammation subsequently causes airway edema, mucus hypersecretion, mucus plugging, and airway remodeling. The process of airway remodeling is driven by subepithelial fibrosis, sub-basement membrane thickening, increased airway smooth muscle mass, angiogenesis, and mucosal gland hyperplasia—resulting in permanent structural changes. The pathophysiology of how these known factors induce permanent structural changes in various asthma endotypes is through a combination of T helper (Th) 1, 2, and 17 responses in addition to the underlying genetic predisposition (Adeli et al., 2019;Aftab et al., 2019)

Bronchial asthma is a disease that currently remains one of the most common respiratory diseases, as evidenced by increasing morbidity and mortality rates even in the most advanced countries. Hospitals as medical service units are inevitably involved in the treatment and care of patients with bronchial asthma cases. The control and education of bronchial asthma in hospitals are very important for society to obtain from healthcare providers because they contribute knowledge to the community about how to minimize asthma exacerbations (Purnamasari, 2018; Tandi, 2018)

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Beta-adrenergic antagonist asthma drugs are the most potent bronchodilators currently available for clinical use in asthma and obstructive disease. Salbutamol is one of the safest and most effective bronchodilators. It is not wrong that this drug is widely used to treat asthma. The research results on the most common classes and types of bronchial asthma drugs at Anutapura General Hospital, Palu show that selective β-2 agonists comprise 35.71% of the drugs. Selective β-2 agonist asthma drugs are the safest and most effective bronchodilators for asthma treatment. Selective β-2 agonists are drugs that work on receptor cells to mimic their original properties, in other words they work like adrenaline so that the respiratory tract relaxes. The most effective drugs in relaxing airway smooth muscle and restoring bronchoconstriction are short-acting β-2 adrenergic agonists. Treatment using selective β-2 agonists is preferred for rapid relief of dyspnea symptoms caused by asthmatic bronchoconstriction. Beta-agonist drug therapy is sometimes combined with anticholinergic drugs to achieve better effects. Similar to beta-agonists, anticholinergic drugs such as Ipratropium bromide work by relaxing the bronchi. Generally used to treat acute attacks. Bronchial asthma treatment therapy at RSU Anutapura Palu also uses anticholinergic asthma drugs at 18%. Inhaled anticholinergic drugs (Ipratropium bromide) are bronchodilators that block postganglionic vagal efferent pathways. This drug causes bronchodilation by reducing the vagal tone of the respiratory tract and blocking the bronchocontric reflex caused by inhalation irritants. This drug reduces early and late-phase allergic reactions as well as reactions after exercise. Compared to beta2-agonists, its bronchodilator ability is weaker and has a slower onset of action (30-60 minutes for maximum effect). In severe asthma attacks, In severe asthma attacks, combination therapy with β2 agonists and anticholinergics is also recommended at the initial stage of treatment. Combination inhalation bronchodilator therapy in several studies has shown greater bronchodilation effects than monotherapy with β2 agonists alone(Tandi, 2018).

CONCLUSION

Asthma is a chronic disease that patients usually experience from a young age, especially since children. Patients with acute asthma attacks usually have a triad of clinical symptoms, that is shortness of breath, coughing, and wheezing. Other symptoms that can be experienced include chest tightening, sputum production, decreased work tolerance, and sore throat. Control and education of bronchial asthma in hospitals are crucial for the public to receive from health workers as they contribute to public knowledge on minimizing asthma exacerbations and understanding what proper treatment processes are both good and correct.

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