بسم اللَّـهِ الرَّحْمَـٰنِ الرَّحِيمِ

(يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ)

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Abstract

Background: Bronchiolitis is a common respiratory tract infection usually affecting infants and young children during annual epidemics. It is characterized by wheeze, respiratory distress, and poor feeding. Respiratory syncytial virus is the most common cause for bronchiolitis and is amongst the most important pathogens causing respiratory infection in infants worldwide. The healthcare burden of bronchiolitis is large, due to large numbers of hospitalized infants and the high risk of nosocomial spread during epidemics.

Recurrent oral ulceration is common and may present in childhood. Causes of recurrent oral ulceration are numerous and there may be an association with underlying systemic disease. Recurrent aphthous stomatitis is the most common underlying diagnosis in children. The discomfort of oral ulcers can impact negatively on quality of life of a child, interfering with eating, speaking and may result in missed school days.

Angular cheilitis also called perleche or angular cheilitis is a lesion marked with fissures, cracks on corner of lip, reddish, ulceration accompanied by burning sensation, pain and dryness on the corner of the mouth. In severe cases, these cracks can bleed when opening the mouth and cause shallow ulcer.

Objectives: To find the prevalence of oral manifestations, detect the association between the age of patients and the bronchiolitis and determine the relationship between gender, age and the laboratory investigations (hemoglobin level, platelet counts and red blood cells counts) in relation to patients with bronchiolitis.

Materials and Method: A cross - sectional study was carried out among 50 patients with bronchiolitis, the study conducted from the period (10/ 2022) to (3/2023) to detect the prevalence of oral manifestations in Al-Batool Teaching Hospital in Diyala with age range from (2 months – 6 years), detection the hemoglobin level,

platelet counts and red blood cells counts. The data were collected using questionnaires. The questionnaires had two sections. The first section contained personal information. The second section involved questions related to aphthous ulcers, angular cheilitis and recurrent herpes labialis. The blood collected into small plastic polyethylene tube. The collected blood, later used for various biochemical studies including the following hemoglobin level, platelet counts and red blood cells counts. Statistical Analysis System- SAS (2018) program was used to detect the effect of difference groups in study parameters. T-test was used to significant compare between means. Chi-square test was used to significant compare between percentage (0.05 and 0.01 probability) in this study.

Results: The study samples consist of (50) patients with bronchiolitis of both genders, 26(43.33%) were males and 34(56.67%) were females. Out of (50) patients with bronchiolitis of both genders, 44(73.33) were ≤1 year and 16(16.67) were > year. The age range of patients from (2 months – 6 years). The mean value of Hb (10.55), PLT (370.81) and RBC (4.53) in males, while in female Hb (10.49), PLT (408.62) and RBC (4.56) with a statistically non-significant relationship except PLT have significant relationship. The mean value of Hb (10.52), PLT (400.34) and RBC (4.55) in patients (≤1 year) while in patients more than 1 year: Hb (10.51), PLT (369.93) and RBC (4.54) with a statistically non-significant relationship. Out of 50 patients suffering from bronchiolitis 3 (5%) were complaining from aphthous ulcer, while 4 (6.67%) complaining from angular cheilitis with a statistically highly significant relationship.

Conclusions: Differences between male and female patients regarding platelet counts with a statistically significant relationship, whereas non-significant relationship regarding hemoglobin level and red blood cells counts. This study demonstrated the existence of a relationship between bronchiolitis and aphthous ulcer and angular cheilitis with a statistically highly significant relationship. Bronchiolitis is more common in patient ≤1 year old.

Introduction

Bronchiolitis is a viral infection that causes the airways (bronchioles) in the lungs to become narrow, which makes breathing difficult. It occurs most often in children under age 2 years during winter and early spring. Very rarely, adults can get bronchiolitis. For instance, there is a condition called bronchiolitis obliterans, which is sometimes known as “popcorn lung.” This condition is usually caused by breathing in irritating chemicals or other substances.[1]

Respiratory syncytial virus (RSV) causes direct damage to airways, but an exaggerated host immune response may contribute to the pathogenesis of airway obstruction in bronchiolitis. The mainstays of therapy include oxygen supplementation and fluid resuscitation, and other modalities remain controversial. There are no studies to support the use of corticosteroids alone in the treatment of bronchiolitis, but several recent reports demonstrate the value of bronchodilator therapy in some patients. Antiviral agents such as ribavirin show great promise in a therapy for bronchiolitis. In addition, ribavirin may modify some aspects of the immune response during acute infection with RSV, and therefore may play a role in the prevention of long-term sequelae. [2]

Approximately 70% of infants ≤ 1 year old become infected by RSV, and almost all children ≤ 2 years old become infected at least once. RSV-related healthcare utilization is highest for infants aged < 1 year; hospitalization rates due to RSV are 17 times higher than for flu in this age group. Preterm infants and infants with underlying conditions such as chronic lung disease, cardiovascular disease, immunosuppression or neuromuscular disorders are at high risk of severe RSV episodes. However, the disease mostly affects healthy infants, with 76% of RSV hospitalized infants being otherwise healthy and born at term. [3]

The diagnosis of bronchiolitis is based on typical history and results of a physical examination. The indications for and utility of diagnostic and supportive laboratory testing (e.g., chest x-ray films, complete blood cell counts, and respiratory syncytial virus testing) are unclear. [4]

An aphthous ulcer is the most common ulcerative condition of the oral mucosa, and presents as a painful punched-out sore on oral or genital mucous membranes. They are also called aphthae, aphthosis, aphthous stomatitis and canker sores.

The exact reason why aphthous ulcer develops is not yet clearly defined. Approximately 40% of people who get aphthous ulcers have a family history of aphthous ulcers. Current thinking is that the immune system is disturbed by some external factor and reacts abnormally against a protein in mucosal tissue.

Figure (1) Aphthous ulcer in inner surface of cheek.

Angular cheilitis is an inflammatory condition characterized by erosive inflammation at one or both angles of the mouth. It typically presents as erythema, scaling, fissuring, and ulceration. A wide variety of factors, including nutritional deficiencies, local and systemic factors, and drug side effects, may produce cheilitis [6]

Despite antifungals being the first-line treatment for most of clinicians, very limited scientific evidence supports their reliability. Furthermore, alternative topical treatments, various techniques of occlusal vertical dimension restoration, B-vitamin supplementation, anti-drooling prosthetic device, and photodynamic therapy have been experimented and propose.[7]

Figure (2) Bilateral angular cheilitis in both angles of the mouth.

Herpes Simplex Virus **(**HSV) causes a contagious infection that affects approximately 60% to 95% of adults worldwide. HSV1 and HSV2 primarily infect human populations. HSV1 is associated chiefly with infections of the mouth, pharynx, face, eye, and central nervous system (CNS), and HSV2 is associated primarily with infections of the anogenital region, although both serotypes may infect any area. [8]

Productive viral infection in mucosal epithelial cells may result in clinical symptoms and is followed by a latent infection within sensory neurons. During productive infection a large number of viral gene products are expressed while during latent infection few or no viral proteins are expressed. Reactivation from latency results in recurrent infections and disease at or near the primary site of infection.[9]

Figure (3) Recurrent herpes labialis in child.

Association between anemia and acute lower respiratory tract infection

Global prevalence of anemia is in increase throughout and currently being 43% in children, Under-five are more prone to lower respiratory tract infections like croup syndromes, bronchitis, bronchiolitis and pneumonia. Anemia by providing a hypoxic environment in the respiratory circulation can be one major contributor to lower respiratory tract infections in the under-five age group.[10]

Children having acute bronchiolitis had comparatively lower hemoglobin level and mean cell hemoglobin concentration (MCHC) than in those who were healthy controls. Whereas, the median red cell distribution was higher in patients with acute bronchiolitis. If patients had a hemoglobin level lower than or equal to 10 grams/dL, it is more likely that the bronchiolitis getting worse, that is increasing ten times in patients with acute bronchiolitis. A negative correlation was seen between the severity of bronchiolitis and hemoglobin level.[11]

Therefore, the present study was investigated in order to show the prevalence of oral manifestations in the patients with bronchiolitis.

Finally, the research is supplemented with biochemical studies for different laboratory investigations to identify the effect of gender and age on these laboratory investigations to test if significant differences will find.

Aims of the study

The present study will design to

1-Determine the prevalence of oral manifestations in the patients with bronchiolitis, to provide a base line information for future studies and comparison and to correlate demographic with clinical finding.

2-Detect the association between the age of patients and the bronchiolitis.

3- Determine the relationship between gender, age and the laboratory investigations (hemoglobin level, platelet counts and red blood cells count) in relation to patients with bronchiolitis.

Subjects, materials and methods

1-The samples

The study samples consist of (50) patients with bronchiolitis, the study conducted from the period (10/ 2022) to (3/2023) to detect the prevalence of oral manifestations in Al-Batool Teaching Hospital in Diyala with age range from (2 months – 6 years), detection the hemoglobin level, platelet counts and red blood cells count.

2-Instruments used for oral examination of patients

- Disposable plane mouth mirror.
- Piece of gauze.
- Plastic spatula.

3-Materials:

Material used for biochemical analyses

Equipment and Kits

-Spectrophotometer.

-Water bath at 37 °c temperature.

-Vortex mixture.

-Stop wax

-Centrifuge.

-Disposable syringes 5ml.

-Pipettes "precision and adjustable".

-Test tubes (different sizes).

4- Methods

-Method of examination

A-Questionnaire

B-Oral examination

All the patients examined by a single examiner, under standardized conditions; the oral

cavity examined in an artificial light by using a mouth mirror.

C- Oral manifestations:

Oral manifestations were classified according to the following criteria: -

a-Aphthous ulcer:

Presents as a painful open sore inside the mouth, or upper throat characterized by a break in the mucous membrane.

b-Angular cheilitis:

Appear as inflammatory lesion at the labial commissure, or corner of the mouth, and often occurs bilaterally. The condition manifests as deep cracks or splits. In severe cases, the splits can bleed when the mouth is opened and shallow ulcers or a crust may form.

5-Biochemical study

Specimen collection: the blood collected into small plastic polyethylene tube, then collected blood used for various biochemical studies including the following:

a- Hemoglobin. b- Platelet counts. c- Red blood cells count.

Statistical Analysis:

The Statistical Analysis System- SAS (2018) program was used to detect the effect of difference groups in study parameters. T-test was used to significant compare between means. Chi-square test was used to significant compare between percentage (0.05 and 0.01 probability) in this study.

Results

The study samples consist of (50) patients with bronchiolitis of both genders, 26(43.33%) were males and 34(56.67%) were females as shown in table (1).

Table (1): Distribution of samples study according to gender

Sex	No.	Percentage (%)
Male	26	43.33
Female	34	56.67
Total	60	100%
P-value	---	0.0477 *
* (P≤0.05).		

Out of (50) patients with bronchiolitis of both genders, 44(73.33) were ≤1 year and 16(16.67) were > year. The age range of patients from (2 months – 6 years) as shown in table (2).

Table (2): Distribution of sample study according to Age groups

Age groups	No.	Percentage (%)
≤1 year	44	73.33
> year	16	16.67
Total	60	100%
P-value	---	0.0001 **
** (P≤0.01).		

The mean value of Hb (10.55), PLT (370.81) and RBC (4.53) in males while in female Hb (10.49), PLT (408.62) and RBC (4.56) with a statistically non-significant relationship except PLT have significant relationship as shown in table (3).

Table (3): Effect of gender on Hb, PLT and RBC

Sex	Mean ± SE		
	Hb	PLT	RBC
Male	10.55 ±0.26	370.81 ±21.29	4.53 ±0.13
Female	10.49 ±0.21	408.62 ±21.64	4.56 ±0.09
T-test	0.663 NS	52.245 *	0.324 NS
P-value	0.857	0.0489	0.839
S * (P≤0.05), NS: Non-Significant.			

The mean value of Hb (10.52), PLT (400.34) and RBC (4.55) in patients (≤1 year) while in (>1 year) Hb (10.51), PLT (369.93) and RBC (4.54) with a statistically non-significant relationship as shown in table (4).

Table (4): Effect of Age groups in Hb, PLT and RBC

Age groups	Mean ± SE		
	Hb	PLT	RBC
≤1 year	10.52 ±0.20	400.34 ±17.49	4.55 ±0.09
>1 year	10.51 ±0.26	369.93 ±32.35	4.54 ±0.12
T-test	0.743 NS	41.750 NS	0.363 NS
P-value	0.966	0.441	0.955
NS: Non-Significant.			

Out of 50 patients suffering from bronchiolitis 3 (5%) were complaining from aphthous ulcer, while 4 (6.67%) complaining from angular cheilitis with a statistically highly significant relationship and 0 (0.00%) of herpes simplex, As shown in table (5).

Table (5): Distribution of samples study according to Aphthous ulcer, Angular cheilitis and Herpes simplex

	Positive No (%)	Negative No (%)	P-value
Aphthous ulcer	3 (5.00%)	57 (95.00%)	0.0001 **
Angular cheilitis	4 (6.67%)	56 (93.33%)	0.0001 **
Herpes simplex	0 (0.00%)	60 (100%)	0.0001 **
** (P≤0.01).			

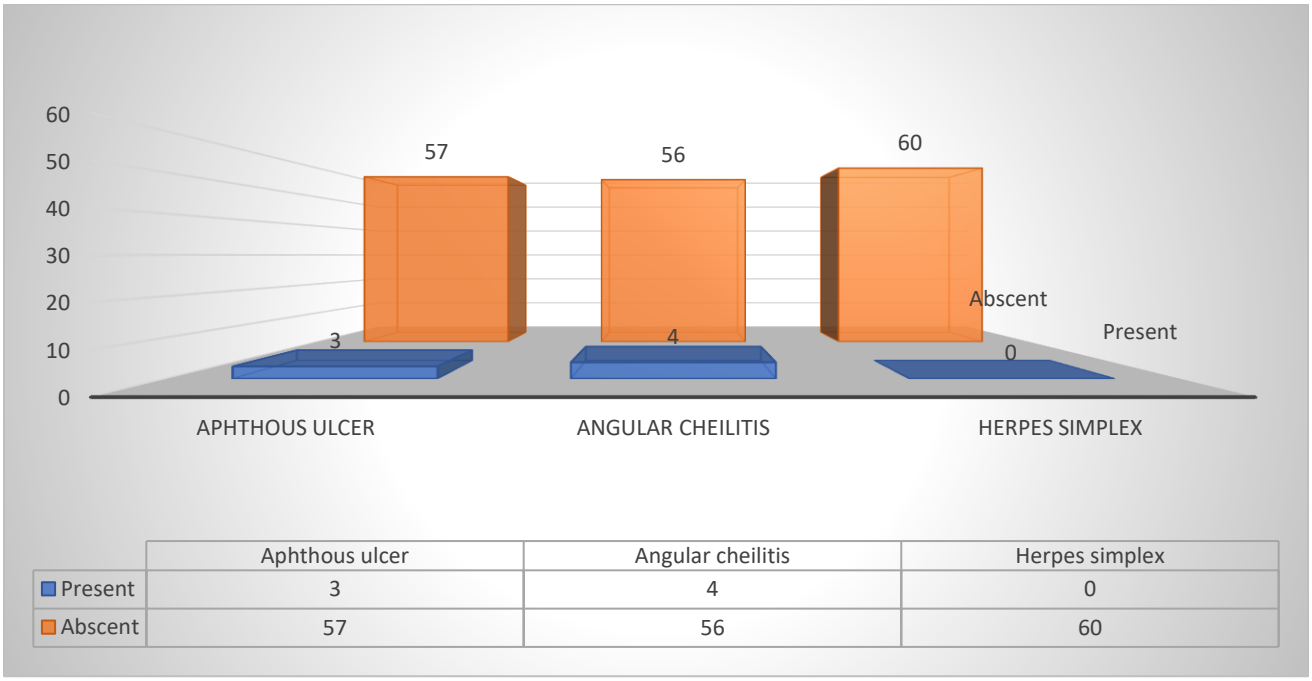

Figure (4): The bar chart illustrated the oral manifestations in patients with bronchiolitis.

Discussion

Bronchiolitis is inflammation of the small airways in the lungs. Acute bronchiolitis is due to a viral infection usually affecting children younger than two years of age. [12] Symptoms may include fever, cough, runny nose, wheezing, and breathing problems. [13] More severe cases may be associated with nasal flaring, grunting, or the skin between the ribs pulling in with breathing. [13] If the child has not been able to feed properly, signs of dehydration may be present. [13]

The present study consists of (50) patients with bronchiolitis of both genders, 26(43.33%) were males and 34(56.67%) were females. Out of (50) patients with bronchiolitis of both genders, 44(73.33) were ≤1 year and 16(16.67) were > year.

The finding of a more severe disease reflects the different characteristic of younger infants with bronchiolitis, who present with retractions, feeding difficulties, and diffuse crackles and, because of the age are predisposed to a more severe disease. In fact, the leading risk factor for severe bronchiolitis is the young age. [14] In addition, 0–6 months old infants had a longer hospital stay. It may be explained because of the more severe illness in this age group. The multivariate analysis showed that the need of IV fluid was higher in the group aged 0–6 months, reflecting a higher severity of presentation in this age group. [15]

Age of infants is associated with clinical findings of bronchiolitis. Most of severe cases needing for example intensive care occur in infants younger than three months. Younger age is associated with higher respiratory rate, more chest retractions and less wheezing, more crackles on auscultation, more feeding problems and more infiltrations in chest radiographs. In young infants, the clinical picture of bronchiolitis resembles that of viral pneumonia, often called as pneumonitis. [16]

Likewise, age of infants is associated with viral etiology of bronchiolitis. All respiratory viruses can cause bronchiolitis, but respiratory syncytial virus (RSV) predominates in infants under 6 months of age, and rhinovirus in children over 12 months of age. [17]

Our study agrees with study done by Hall *et al.*, [18], who analyzing hospitalizations for acute respiratory infections in infants < 24 months reported that the hospitalization rate was higher during the first three months of life and then consistently declined.

In the present study the mean value of PLT is (370.81) in males, while in female PLT (408.62) with a statistically significant relationship.

Male gender is known to be a risk factor for severe RSV bronchiolitis with a risk ratio of boys to girls being 1.425:1. [19]

Out of 50 patients suffering from bronchiolitis 3 (5%) were complaining from aphthous ulcer, while 4 (6.67%) complaining from angular cheilitis with a statistically highly significant relationship.

Aphthous stomatitis is a common disease, affecting about 20% of the general population, in children the estimated prevalence is 9% [20]. Due to the high prevalence medical and dental professionals are repeatedly confronted with pediatric patients complaining about oral ulcers, but the diversity of causative factors can make a diagnosis challenging.

Causes can range from infections to allergies, nutritional deficiencies, autoinflammation, genetics or can be drug induced, therefore children with oral ulcers are often treated by general pediatricians, dentists, rheumatologist, allergologists and many more specialists. [21]

Angular Cheilitis occurs more in children and it is caused by children sensitivity against certain contact agents like toys, foods, sunlight, allergy against medicines, cosmetics, and long-term antibiotic treatment. Disease attacking the corners of the mouth is often cause pain when patients experience dry mouth or xerostomia. This disease can also be caused by vitamin B complex deficiency, blood iron deficiency, denture sore mouth and other factors such as breathing through mouth, wetting lips with tongue, and licking the corner of the mouth with tongue. [22].

Factors that caused angular cheilitis are candidiasis, trauma on oral cavity, nutrition status of children, manifestations of systemic disease and viral infections. The cause of

angular cheilitis prominent in children is a nutritional deficiency. Nutritional deficiency is usually caused by inadequate intake of vitamin B complex (riboflavin), iron and folic acid. [23]

Various manifestations of systemic disease in which a patient suffering from a disease that affects the entire body and show signs and specific oral symptoms such as hematological disorders: anemia due to iron deficiency, endocrine disorders: diabetes mellitus, viral infections: human immunodeficiency virus, advanced malignant disease, leukemia, hematological disorder in patients suffer from anemia.

Virus infection is not like bacteria that consist of a single cell and is able to grow independently. The cellular destruction by virus infection that is responsible for many of the clinical features of viral infections that affect the oral cavity. [24]

Conclusions

1- Differences between male and female patients regarding platelet counts with a statistically significant relationship, whereas non-significant relationship regarding hemoglobin level and red blood cells counts.

2- This study demonstrated the existence of a relationship between bronchiolitis and aphthous ulcer and angular cheilitis with a statistically highly significant relationship.

3- Bronchiolitis is more common in patient ≤1 year old.

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