

Prospective Assessment of the Pattern of Community Acquired Pneumonia among Pregnant Women

Nutan Narayan

Assistant Professor, Department of Obstetrics & Gynecology, Nalanda Medical College & Hospital, Patna, Bihar, India.

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Corresponding author: Dr. Nutan Narayan

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Abstract

Aim: The aim of this study was to assess the pattern of community acquired pneumonia among pregnant women in tertiary care hospital.

Material & Methods: Total 50 pregnant ladies presented with signs, symptoms & radiological findings consistent with community acquired pneumonia were selected from outpatient's clinics at the Department of Obstetrics & Gynecology, Nalanda Medical College & Hospital, Patna, Bihar, India for 15 months

Results: Cough (94%) was the most common symptom followed by fever (76%) among the patients. The most common organisms isolated were streptococcus pneumonia, hemophilus influenza, staphylococcus aureus mycobacterium tuberculosis.

Conclusion: Morbidity and mortality in pregnant patients with pneumonia continue to pose a significant challenge. Early recognition of the diseases process and appropriate antibiotic treatment are required to ascertain an optimal outcome. The treatments in the gravid patients generally follow standard guidelines for the treatment of pneumonia in adults. Concern for fetal outcome should not delay any treatment strategies as improvement in maternal oxygenation and status is the best way to ensure fetal protection.

Keywords: Community acquired pneumonia, Pregnancy.

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Introduction

Community acquired pneumonia (CAP) is recognized as a common problem that carries a substantial morbidity and mortality. The burden of disease falls mainly on people at the extremes of age and the occurrence of CAP in young adults is uncommon. Nevertheless, pneumonia in young adults can be severe and fatal. [1] In the pregnant patient, pneumonia is the most frequent cause of fatal non-obstetric infection. [2]

Several physiological and immunological changes that are experienced during

pregnancy, such as altered T lymphocyte immunity, increased oxygen consumption, decreased functional residual capacity, decreased chest compliance, and increased risk of aspiration, may predispose pregnant women to a more severe course of pneumonia, which may result in greater maternal and fetal morbidity and mortality. [3-4]

A meta-analysis revealed that influenza infection in pregnant individuals resulted in a higher risk of hospital admission than influenza infection in nonpregnant

individuals [5]. Early recognition and prompt treatment of severe pneumonia are essential to improve maternal and perinatal outcomes. [6]

Often there are difficulties in diagnosis of CAP during pregnancy reflect the complexity of differentiating between symptoms related to physiological changes and more sinister symptoms of disease. Patients themselves may attribute symptoms of pneumonia to pregnancy and hence usually present late to the clinicians. Chest discomfort may also occur in the later stages of pregnancy, possibly due to the mechanical effects of the uterus on the diaphragm. It may be difficult to distinguish it from other causes of chest discomfort. [7]

The aim of this study was to assess the pattern of community acquired pneumonia among pregnant women in tertiary care hospital.

Material & Methods:

Total 50 pregnant ladies presented with signs, symptoms & radiological findings consistent with community acquired pneumonia were selected from outpatient's clinics at the Department of Obstetrics & Gynecology, Nalanda Medical College & Hospital, Patna, Bihar, India for 15 months

The diagnosis of CAP was based on the presence of common clinical features (e.g., cough with expectoration, fever, shortness of breath, and pleuritic chest pain) along with radiological features consistent with pneumonia (chest radiography). Thorough clinical examination was done in the OPD/IPD to establish the diagnosis of community acquired pneumonia and to exclude any other chest diseases.

A chest radiograph was required for the routine evaluation of patients who were likely to have pneumonia, to establish the diagnosis. But it is estimated that radiation doses to the mother from a standard

departmental posteroanterior chest radiograph, performed with a grid to reduce scatter and a peak voltage for the beam of 90–120 kV, is 5–30 m Rad. The absorbed dose for the uterus and fetus is 100 times less (about 300 μ Rad). [8] Complete blood count including total count differential count, liver function test, and renal function tests were done for all the patients. Pretreatment sputum samples were obtained from all patients. Good quality samples (having fewer than 10 squamous epithelial cells and more than 25 neutrophils per low power field) are subjected to the followings:

1. Direct smear stained with Gram stain and Ziehl Neelsen stain (to detect acid fast bacilli).
2. Aerobic culture for bacteria using conventional culture media: blood agar, chocolate agar, MacConkey agar and Lowenstein Jensen media.

Statistical Methods

All data were collected, summarized, and analyzed by using an appropriate statistical package program (Epi info software). For quantitative data which were normally distributed and summarized by mean and standard deviation. For qualitative data were summarized by number and percentage.

Results:

The present study included 50 pregnant ladies with community acquired pneumonia, who were selected from outpatient's clinics of obstetrics and gynecology department. Their ages ranged from 19–38 years old with mean age of 23.29 years old (± 4.59 SD).

Cough (94%) was the most common symptom followed by fever (76%) among the patients. [Table 1].

Table 1: Symptomatology among the pregnant patients diagnosed with CAP

History	Number	Percentage %
Fever	38	76%
Cough	47	94%
With expectoration	34	68%
Breathlessness	20	40%
Chest pain	10	20%
Wheezing	7	14%
Hemoptysis	4	8%

The most common radiological findings are consolidation (98%) nodular infiltrates (36%), cavity (26%), and pleural effusion (12%). [Table 2]

Table 2: Radiological findings

Chest x ray findings	Number	Percentage %
Consolidation	49	98%
Nodular infiltrates	18	36%
Cavity	13	26%
Pleural effusion	6	12%
normal	2	4%

The most common organisms isolated were streptococcus pneumonia, hemophilus influenza, staphylococcus aureus mycobacterium tuberculosis.[Table 3]

Table 3: Prevalence of microorganisms in studied pregnant ladies with CAP

Organisms	Number	Prevalence %
Streptococcus pneumonia	24	48%
Hemophilus influenza	6	12%
Staphylococcus aureus	4	8%
Mycoplasma pneumonia	1	2%
Kleibisella pneumonia	3	6%
Mycobacterium tuberculosis	7	14%
Pseudomonas aeruginosa	2	4%
No organisms isolated	9	18%

Discussion:

Alterations in cellular immunity have been widely reported and are aimed primarily at protecting the fetus from the mother. These changes include decreased lymphocyte proliferative response, especially in the second and third trimesters, decreased natural killer cell activity, changes in T cell populations with a decrease in numbers of circulating helper T cells, reduced lymphocyte cytotoxic activity, and production by the trophoblast of substances that could block maternal

recognition of fetal major histocompatibility antigens. [9-13] In addition, hormones prevalent during pregnancy—including progesterone, human chorionic gonadotropin, alpha-fetoprotein and cortisol—may inhibit cell mediated immune function. These changes could theoretically increase the risk from infection, particularly by viral and fungal pathogens. [12]

Twenty-five percent of our patients (3/12) had severe preeclampsia, which is much higher than reported prevalence of severe

preeclampsia of 0.49% in China [14]. Romanyuk et al. and Chen et al. also reported that women with pneumonia had a higher prevalence of preeclampsia/eclampsia than women without pneumonia [15]. This increased incidence of preeclampsia/eclampsia might be the result of the pathophysiological changes associated with pneumonia.

Severe pneumonia is characterized by hypoxemia, which subsequently causes placental hypoxia. The hypoxic placenta releases antiangiogenic and proinflammatory factors that converge upon the maternal endothelium, inducing endothelial dysfunction, hypertension, and organ damage [16]. The three patients complicated with preeclampsia had significantly lower PaO₂/FIO₂ ratios than those without preeclampsia (mean value: 118 vs 191, $p = 0.004$), and two of these patients died. Preeclampsia may cause pulmonary edema. Of all obstetric causes of respiratory failure before delivery, severe preeclampsia is the leading cause [17].

Certain pathogens can cause pneumonia in immunocompromised patients. These include bacteria (Staphylococcus, Mycoplasma, and Mycobacterium), fungal, viral, and parasitic organisms (including *Pneumocystis carinii*) [18]. *Pneumocystis pneumonia* is the most common cause of AIDS-related death among pregnant patients [19]. Most patients present with dry cough, tachypnea, and dyspnea, and chest radiographs demonstrate diffuse interstitial infiltrates. In most cases, the diagnosis can be made by histiologic staining of sputum, although bronchoscopy may be necessary in some cases. *Pneumocystis pneumonia* in pregnancy carries significant risk to the mother and fetus. In a review of 22 cases of *Pneumocystis pneumonia* in pregnancy, Ahmad et al. [19] demonstrated a 59% rate of respiratory failure with need for mechanical ventilation. The overall mortality in this series was 50%, compared

with 1–16% in a nonpregnant population [19]. Fetal mortality was high, with five intrauterine deaths and four neonatal deaths [19]. Although the patients in this series were treated with trimethoprim/sulfamethoxazole (TMP/SMX), with or without corticosteroids, the episode of *Pneumocystis pneumonia* was the presenting illness of HIV/AIDS for these patients [19].

In agreement with Halm and Teristein, [20] who stated that, the evaluation of community acquired pneumonia is initiated based on patients symptoms of bacterial pneumonia in pregnancy are the same as in nonpregnant individuals. Mild upper respiratory complains preceding symptoms that include cough in more than 90%, sputum production in 66%, dyspnea in 66% and pleuritic chest pain 50%, and non-respiratory symptoms including headache, fatigue, myalgia, sweat and nausea. Also, Kasper et al. stated that, clinical symptoms of pneumonia including fever, cough, pleuritic chest pain, rigors, chills, and dyspnea. During pregnancy 59.3% of patients reported cough, 32.2% shortness of breath and 27.1% reported pleuritic chest pain. [21]

W.H. Goodnight et al in their study found the most common single pathogen is streptococcus pneumonia which is responsible for 30–50% of identified cases followed by H. influenza and M. pneumonia. [22, 23]

Conclusion:

Morbidity and mortality in pregnant patients with pneumonia continue to pose a significant challenge. Early recognition of the diseases process and appropriate antibiotic treatment are required to ascertain an optimal outcome. The treatments in the gravid patients generally follow standard guidelines for the treatment of pneumonia in adults. Concern for fetal outcome should not delay any treatment strategies as improvement in

maternal oxygenation and status is the best way to ensure fetal protection.

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