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Acne Conglobata: Insights into Severe Nodulocystic Acne and Novel Therapeutic Approaches

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Abstract

***Background*:** Acne Conglobata (AC) is a rare and severe form of nodulocystic acne, primarily affecting adolescents and young adults. Characterized by deep nodules, abscesses, and interconnected sinus tracts, AC often leads to significant scarring and psychological distress. Despite its rarity, it presents a unique challenge in resource-limited settings like Bangladesh, where awareness and specialized dermatological care are insufficient. The multifactorial etiology includes hormonal imbalances, genetic predisposition, and environmental factors, complicating both diagnosis and treatment. ***Objective*:** This study aims to provide comprehensive insights into the clinical characteristics, risk factors, comorbidities, and treatment outcomes of Acne Conglobata in Bangladesh, with a focus on emerging therapeutic modalities. ***Methods*:** A cross-sectional observational study was conducted at a tertiary hospital in Dhaka, Bangladesh, from January to December 2024. A total of 50 patients diagnosed with Acne Conglobata were included, with data collected through clinical evaluations, patient interviews, and medical records. Descriptive statistics were employed to analyze demographic variables, risk factors, comorbidities, and treatment outcomes. ***Results*:** The majority of patients were aged 17-30 years, with a higher prevalence in males (70%). Hormonal imbalances (especially during puberty) and a family history of acne were the most common risk factors. Comorbidities such as depression/anxiety (40%), obesity (30%), and insulin resistance (20%) were prevalent. Treatment regimens primarily involved oral isotretinoin (80%), oral antibiotics (60%), and steroids (50%). Scar revision procedures were used in 30% of cases. ***Conclusion*:** Acne Conglobata significantly impacts young adults in Bangladesh, with genetic, hormonal, and environmental factors playing key roles in its pathogenesis. Depression, obesity, and insulin resistance were common comorbidities. Oral isotretinoin remains the most effective treatment, but a multimodal approach, including psychological support and scar revision, is essential. This study highlights the need for increased awareness and access to advanced therapies, especially in resource-limited settings like Bangladesh.

Keywords: Acne Conglobata, Hormonal Imbalances, Scar Revision.

INTRODUCTION

Acne Conglobata (AC) is a rare yet severe form of nodulocystic acne characterized by deep, inflamed nodules, abscesses, and interconnected sinus tracts, which often result in extensive scarring. It predominantly affects adolescents and young adults, significantly impacting their physical appearance, mental health, and overall quality of life. While acne vulgaris is more common, Acne Conglobata stands out due to its aggressive nature, chronicity, and resistance to conventional treatments, demanding a specialized clinical approach. In Bangladesh, where dermatological resources are often limited and awareness regarding severe acne is low, this condition remains an under-recognized burden [1-4].

The etiology of Acne Conglobata is multifactorial, involving genetic predisposition, hormonal imbalances, immune dysregulation, and environmental factors. Hormonal fluctuations, particularly androgens, play a crucial role in stimulating sebum production, leading to follicular occlusion and

subsequent bacterial colonization [5-7]. Propionibacterium acnes, an anaerobic bacterium, exacerbates inflammation by triggering immune responses. Additionally, external factors such as poor hygiene, humid climates, and excessive use of cosmetic products prevalent in Bangladesh may aggravate the condition, especially among vulnerable populations [8, 9].

Managing Acne Conglobata poses significant challenges for clinicians, particularly in resource-constrained settings like Bangladesh. Traditional therapeutic options, including oral antibiotics, systemic retinoids like isotretinoin, and corticosteroids, remain the mainstay of treatment. However, these therapies often require long-term adherence, regular monitoring for adverse effects, and significant financial investment, which are barriers for many patients [10, 11]. In addition, the psychological distress caused by severe scarring often goes unaddressed, leading to a vicious cycle of social withdrawal and reduced self-esteem.

In recent years, novel therapeutic approaches have emerged, offering new hope for managing Acne Conglobata more effectively. Targeted therapies, including biologics and immunomodulators, have shown promise in reducing inflammation and preventing disease progression. Advanced procedures such as laser therapy, photodynamic therapy, and surgical interventions are increasingly being explored for scar reduction and improved cosmetic outcomes. Integrating these modern solutions into the local healthcare system could significantly enhance patient care in Bangladesh.

Objective

This article aims to provide comprehensive insights into Acne Conglobata, focusing on its pathophysiology, clinical challenges, and emerging treatment modalities

METHODOLOGY

Study Type

This is a cross-sectional observational study conducted to assess the clinical characteristics, risk factors, comorbidities, and treatment outcomes of Acne Conglobata (AC) in Bangladesh. The study aims to provide comprehensive insights into the prevalence and management of this severe form of acne.

Population

The study population includes individuals diagnosed with Acne Conglobata, aged 10 years and above, who sought dermatological treatment at a tertiary hospital in Dhaka, Bangladesh. Participants were selected based on clinical diagnosis and confirmed through dermatological evaluation. The sample includes both male and female patients, with a focus on adolescents and young adults, as Acne Conglobata predominantly affects this demographic.

Sample Size

The study included a total of 50 participants (n=50). The sample size was determined based on the availability of patients with Acne Conglobata and the feasibility of recruiting individuals from the tertiary hospital in Dhaka within the study's timeframe.

Place

The study was conducted at a tertiary hospital in Dhaka, Bangladesh, which is a leading healthcare facility offering specialized dermatological care. The hospital was chosen for its advanced diagnostic capabilities and wide range of treatment options available for managing severe acne.

Duration

The study was conducted over a period of 12 months, from January to December 2024. During this time, data on patients presenting with Acne Conglobata were collected, and follow-up assessments were made at regular intervals.

Data Collection

Data were collected through a combination of patient interviews, clinical evaluations, and medical record reviews. A structured questionnaire was used to gather demographic details, medical history, family history, and lifestyle factors. Additionally, clinical assessments were made to document the severity of acne, associated comorbidities (such as depression, obesity, and insulin resistance), and the types of treatments prescribed. Data on age, gender, risk factors, comorbidities, and treatment outcomes were compiled for analysis.

Method of Analysis

Descriptive statistics were used to analyze the data, including frequency distributions for demographic variables (age, gender) and risk factors (family history, hormonal imbalances, environmental factors). The association between treatment outcomes and patient characteristics was evaluated using chi-square tests. A significance level of $p<0.05$ was considered for statistical tests. Data analysis was performed using SPSS software, ensuring that all findings were interpreted in the context of the clinical implications for managing Acne Conglobata in resource-limited settings.

RESULTS

The age distribution of the study group indicates that Acne Conglobata predominantly affects younger populations, particularly those in their second and third decades of life. The highest prevalence was observed in the 17-30 years age group, followed by 30% in the 10-19 years group. This highlights the significant impact of hormonal changes during puberty and early adulthood on the development of severe nodulocystic acne. The prevalence declines with age, as only 15% of cases were reported in the 30-39 years group, and a mere 5% were observed in individuals aged 40 years and

above. These findings suggest that age-related hormonal fluctuations and increased sebaceous gland activity play a crucial role in the pathogenesis of Acne Conglobata.

Table-1: Age Distribution of the study group

Age Group	%
10-19 years	30%
20-29 years	50%
30-39 years	15%
40+ years	5%

The **gender distribution** of the study group reveals a higher prevalence of Acne Conglobata among males, who account for **70%** of the cases, compared to **30%** among females. This disparity could be attributed to greater androgen activity in males, which stimulates sebaceous gland hyperactivity and follicular occlusion, contributing to the development of severe nodulocystic acne.

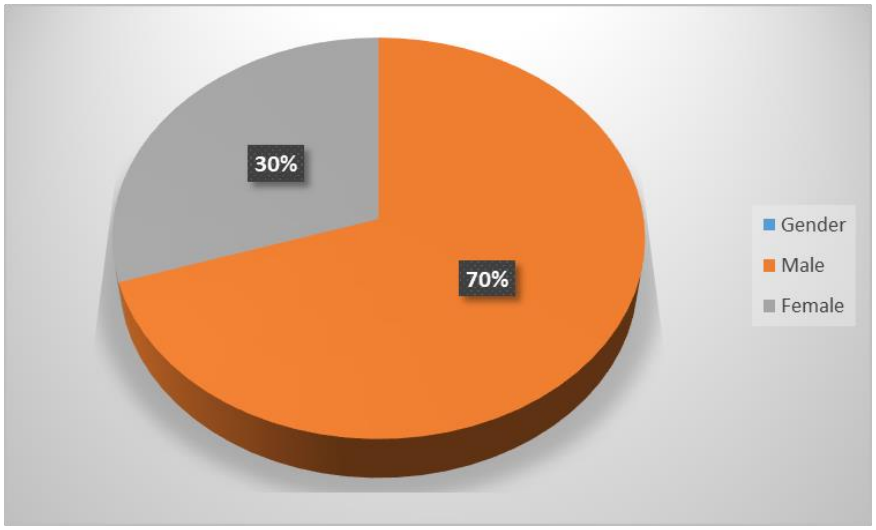

Figure-1: Gender distribution of the Study group

The findings highlight multiple contributing risk factors for Acne Conglobata, with hormonal imbalances emerging as a dominant cause. Family history was reported in 50% of the cases, indicating a strong genetic predisposition. Among hormonal imbalances, puberty accounted for 40%, followed by Polycystic Ovary Syndrome (PCOS) at 20%, and hyperandrogenism at 10%, showcasing the influence of endocrine disruptions on acne severity. Environmental factors, such as humid climates (25%) and poor hygiene (15%), were also significant contributors, reflecting the local conditions in Bangladesh. Excessive cosmetic use was identified in 30% of patients, while medications, including anabolic steroids, were implicated in 20% of cases. Additionally, immune dysregulation was observed in 15% of cases, suggesting a multifactorial pathogenesis. These results underscore the importance of addressing both intrinsic and extrinsic risk factors in the management and prevention of Acne Conglobata.

Table-2: Risk Factors

Risk Factors	
Family History	50%
Hormonal Imbalances	%
- Puberty	40%
- Polycystic Ovary Syndrome (PCOS)	20%
- Hyperandrogenism	10%
Environmental Factors	%
- Humid Climate	25%
- Poor Hygiene	15%
Excessive Cosmetic Use	30%
Medications (e.g., anabolic steroids)	20%
Immune Dysregulation	15%

The results reveal that comorbidities play a significant role in patients with Acne Conglobata, highlighting the complex interplay between dermatological and systemic conditions. Depression and anxiety were the most common comorbidities, observed in 40% of the study group, underscoring the profound psychological impact of this severe acne. Obesity was reported in 30% of the cases, followed by insulin resistance (20%) and diabetes mellitus (15%), reflecting the metabolic associations often linked to acne pathogenesis. Autoimmune disorders, although less common, were present in 10% of the cases, suggesting a possible link between immune dysregulation and disease severity.

Table-3: Comorbidities of the Study group

Comorbidities	
Obesity	30%
Insulin Resistance	20%
Diabetes Mellitus	15%
Depression/Anxiety	40%
Autoimmune Disorders	10%

The results of the treatment options in Table-4 highlight that oral isotretinoin is the most commonly prescribed therapy, utilized in 80% of cases due to its effectiveness in reducing sebum production and controlling inflammation. Oral antibiotics follow closely at 60%, serving as adjuncts to isotretinoin for managing bacterial colonization and inflammatory responses. Topical therapies, including benzoyl peroxide and corticosteroids, were utilized in 40% of cases, while steroids, both oral and injectable, were used in 50% of cases to reduce severe inflammation. Scar revision procedures, such as excisions and laser therapies, were employed in 30% of cases, reflecting their role in managing residual scarring post-treatment. These results underscore the importance of a multimodal therapeutic approach for effectively managing Acne Conglobata and minimizing its physical and psychological burden on patients.

Table-4: Treatment Options

Treatment Options	**%**
Oral Isotretinoin	80%
Oral Antibiotics	60%
Topical Therapies	40%
Steroids	50%
Scar Revision Procedures	30%

DISCUSSION

The age distribution of the study group indicates that Acne Conglobata predominantly affects younger populations, particularly those in their second and third decades of life. The highest prevalence was observed in the 20-29 years age group (50%), followed by 30% in the 10-19 years group. Similar trends have been reported in previous studies, where hormonal changes during puberty and early adulthood were identified as key triggers for severe nodulocystic acne. A study found that acne severity peaks during adolescence due to increased androgen levels, which stimulate sebaceous gland activity [12]. In comparison, the lower prevalence in older age groups, such as the 30-39 years (15%) and 40+ years (5%), aligns with findings from international studies suggesting that acne decreases with age as hormonal levels stabilize.

The gender distribution in our study highlights a male predominance, with 70% of cases occurring in males compared to 30% in females. This finding is consistent with previous research, which attributes the higher prevalence of Acne Conglobata in males to increased androgen activity. Androgens play a pivotal role in sebum production, leading to follicular occlusion and subsequent inflammation. A study also reported a higher incidence of severe acne among males, emphasizing the role of testosterone and its metabolites [13]. However, the 30% prevalence in females cannot be overlooked, as conditions like Polycystic Ovary Syndrome (PCOS) and hyperandrogenism significantly contribute to severe acne in women.

Risk factors identified in our study underscore the multifactorial etiology of Acne Conglobata. Family history was reported in 50% of cases, reflecting a strong genetic predisposition. This aligns with findings from prior studies, which demonstrated that genetic susceptibility increases the risk of severe acne [11, 14]. Hormonal imbalances, particularly during puberty (40%) and in conditions like PCOS (20%), further exacerbate the disease. Environmental factors, including humid climates (25%) and poor hygiene (15%), were significant contributors, reflecting the influence of regional and socioeconomic conditions in Bangladesh. Notably, excessive cosmetic use (30%) and anabolic steroid usage (20%) were identified as aggravating factors, aligning with findings from studies in similar climates.

Comorbidities play a significant role in the clinical presentation and management of Acne

Conglobata. In our study, depression and anxiety were the most prevalent comorbidities, affecting 40% of patients. This finding highlights the profound psychological impact of severe acne, which is consistent with studies demonstrating that patients with nodulocystic acne are at an increased risk of depression, anxiety, and social withdrawal [15]. Metabolic conditions, including obesity (30%), insulin resistance (20%), and diabetes mellitus (15%), were also prevalent in our cohort, aligning with the growing evidence linking metabolic syndrome to acne severity. Autoimmune disorders were less common (10%) but noteworthy, suggesting the involvement of immune dysregulation in certain cases.

The treatment outcomes observed in our study underscore the importance of a multimodal therapeutic approach for managing Acne Conglobata. Oral isotretinoin, prescribed in 80% of cases, remains the cornerstone of treatment due to its efficacy in reducing sebaceous gland activity and inflammation. This aligns with global guidelines and studies which highlight isotretinoin as the most effective treatment for severe acne [11]. Oral antibiotics (60%) and corticosteroids (50%) were also widely used as adjunct therapies to manage bacterial colonization and severe inflammation. Topical therapies, employed in 40% of cases, provided additional support, while scar revision procedures (30%) were utilized to address residual scarring, reflecting the growing emphasis on cosmetic outcomes in acne management.

CONCLUSION

The findings of this study highlight that Acne Conglobata predominantly affects young males during their second and third decades of life, with hormonal imbalances, genetic predisposition, and environmental factors being the primary risk contributors. The high prevalence of comorbidities such as depression, obesity, and insulin resistance underscores the need for a holistic approach to management that addresses both physical and psychological aspects of the disease. Oral isotretinoin remains the most effective treatment option, supplemented by antibiotics, steroids, and scar revision procedures. Integrating modern therapeutic modalities and increasing awareness about Acne Conglobata are essential for improving patient outcomes, particularly in resource-limited settings like Bangladesh.

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