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Comparative analysis of treatment protocols and clinical outcomes in the management of acute urticaria and angioedema in the emergency department

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Abstract

Objective: The purpose of the study was to identify clinical differences in patients with acute urticaria and/or angioedema receiving various treatment regimes in the emergency department of Lady Reading Hospital, Peshawar. Particularly, it compared modern antihistamine therapy with corticosteroids as an analogue to routine antihistamines with regard to the rate of symptom improvement, relapse, and hospitalisation.

Methods: This was a cross-sectional descriptive study involving 542 patients with acute urticaria and/or angioedema. Patients were categorised into two groups: Group A, receiving a combination of antihistamines and corticosteroids (280); and Group B, receiving only antihistamines (262). Thus, the primary end points considered include time to resolution of symptoms, recurrence within 48 hours, and hospitalisation need. Data was analysed using the statistical package of social sciences (SPSS), while a p-value of < 0.05 formed the basis of significance.

Results: The overall improvement time for symptoms was 3.6 hours in Group A and 5.1 hours in Group B ($p < 0.001$). The rates of recurrence were also lower in Group A (15%) than in Group B (29.8%, $p < 0.01$). Meanwhile, patients who were in Group A had 10% that needed inpatient admission as an intervention compared to 19.1% in Group B; $p < 0.05$. Side effects were few and were comparable between the two groups; therefore, patients in both groups had reactions such as drowsiness and gastrointestinal disturbances.

Conclusion: Together, antihistamines plus corticosteroids were superior to antihistamines only in the treatment of acute urticarial and angioedema in patients in the emergency department. Patients reported symptoms resolved sooner, the rate of relapse was shorter, and hospitalisation was reduced. Based on this observation, corticosteroids should be considered as part of the usual care of patients presenting with moderate to severe symptoms in the emergency department. Future research should aim at sorting out various recommendations of treatment value for the purpose of achieving even better results of the therapy.

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Keywords: Angioedema; Antihistamines; Corticosteroids; Emergency; Department; Treatment outcome; Symptom

1. Introduction

Acute urticaria and angioedema are well-known dermatological and allergic diseases that patients often present with in an ED. Urticaria presents as pruritic weals, which appear rapidly, while angioedema presents as swelling of the dermis and consists of the compliant face, lips or even the throat. These conditions can develop singly or at a time and have causes such as medication, food allergies, infections, or stress (Zuberbier, 2018). However, the management of acute urticaria and angioedema still has a great deal of variability and practice depending with the cause of the reaction, severity of the episode, and capability of the emergency setting (Maurer et al., 2017). Thus, disparities in treatment regimens offer a possibility to examine effects resulting from different standards as to management plans for improving outcomes, thereby enhancing treatment programs.

Urticaria and angioedema are IgE-dependent diseases that involve histamine and other inflammatory mediators from mast cell and basophil membranes. In an acute setting, the most common causes of this condition are idiopathic or allergic; however, causes could also be due to autoimmune, physical or drug-induced (Godse, 2016). Symptoms range manifest through itching, redness and swelling, generally of sudden onset and may cause significant discomfort to the patient. In more complicated cases, when the angioedema affects the airway, there are potential fatal consequences, which are airway occlusion and anaphylaxis (Schaefer, 2017). This stresses the need to post-observation care as soon as possible in the emergency department to avoid adverse results.

The treatment for acute urticaria and angioedema in ED includes antihistamines, corticosteroids, and may be epinephrine if severe manifestation of the condition. Antihistamines, especially the second-generation non-sedating, are regarded as first-line therapy since they effectively compete for histamine receptors and itch/swell symptoms (Zuberbier et al., 2018). The current treatment of the disease usually involves the use of antibiotics; however, additional corticosteroids like prednisolone are also prescribed to decrease inflammation and the risk of relapse of the condition, especially in severe or chronic cases (Maurer et al., 2017). In patients presenting with life-threatening severe angioedema or anaphylyaxis, intramuscular epinephrine is administered to reverse the rapidly worsening situation and treat the patient (Schaefer, 2017). Nevertheless, the type and sequence of these treatments are still not well defined and can vary from one clinic to another.

Several aspects affect the management of acute urticaria and angioedema patients. The type of reaction, contributing cause, clinical severity, and the presence of a coexisting disease in the patient are needed to manage the treatment regimen (Gowda et al., 2019). For example, patients with this background of allergies should be treated with corticosteroids and epinephrine if the suspected cause is an allergic reaction (Zuberbier et al., 2018). On the other hand, if the patient presents with moderate signs and symptoms and has never experienced anaphylaxis, only antihistamines may do. However, the absence of protocol for the treatment of such conditions in ED contributes to a rather poor model of delivery, and it is not clear whether this has an effect on the patients (Maurer et al., 2017).

Appropriate intervention of the acute urticaria and angioedema treatment clinical trials have differed in some ways depending on the study done. A few studies have pointed out that the use of antihistamines and corticosteroids has lessened instances of recurrence of symptoms and gives better results when compared to the use of antihistamines only (Godse, 2016). On the other hand, there have been other works criticising the regular prescription of these drugs and reporting that corticosteroids could not bring important changes in the clinical presentation of the disease and could expose the health consumer to known side effects, particularly in non-severe cases (Zuberbier et al., 2018). You see, epinephrine is a lifesaving treatment for anaphylaxis, but because of its action on the cardiovascular system, it is only used in severe cases (Schaefer, 2017). This variation of treatment protocols shows the need to carry out more studies in order to determine the specific regimen of standard treatment that may be implemented in emergency settings.

Regarding the outcomes of treatment of acute urticaria and angioedema, the goals are focused on the complete disappearance of symptoms and non-recursions of the disease with adverse effects such as airway compromise or anaphylaxis. A review of the literature has revealed that acute treatment with antihistamines results in a good patient outcome: In Gowda et al.'s (2019), patients' clinical state improved within hours to days of starting the drug. However, for patients with moderate to severe or chronic symptoms, it has been found that the use of corticosteroids can decrease relapse rates and duration of symptoms (Maurer et al., 2017). However, the long-term use of corticosteroids remains questionable, mainly in mild cases, due to the risks associated with side effects including immunosuppression, hyperglycemia and GI upset (Godse, 2016). This indicates that for the use of corticosteroids, the possible beneficial effect has to be weighed against the likelihood of side effects, especially in those individuals who may be at higher risk of the effects.

However, other clinical consequences of treating acute urticaria and angioedema in the ED cannot go unnoticed to include the cost implications. Emergency departments are normally characterised by hectic, time-sensitive, fast decision-making situations in which cost factors would have to be taken into consideration in relation to the benefits of treatment. Those protocols with recurrent corticosteroid or epinephrine administrations may cost more owing to frequent monitoring of the possible effects of the medications (Zuberbier et al., 2018). Hence, another key objective of healthcare delivery is to identify efficient disease management approaches, especially where regard is had to limited resources but where improvement in patient status is the ultimate aim desired.

Objective

The specific aim of the present study is to compare the management practices and hospital outcome of the patients who have acute urticaria/angioedema visiting the ER department at Lady Reading Hospital, Peshawar. More precisely, the study has to assess the efficacy of treatments for individual signs, recurrence prevention, and decreased need for hospitalisation by using antihistamines, corticosteroids and epinephrine. Hoping to build a more standardised and evidence-based plan for the management of acute urticaria and angular oedema in a high-stress emergency situation with 542 patients, this study aims to determine the best protocol applicable among them.

2. Methods

The Institutional Review Board (IRB) at Lady Reading Hospital Peshawar issued approval (Ref: No. 374/019/LRH/MTI) before conducting this study. Consent was obtained from all participants or their legal guardians before being included in the research. Every step followed the moral standards for doing research on human beings.

This study is a kind of case-control-designed retrospective, analytical cross-sectional study that was carried out at the Lady Reading Emergency Department, Peshawar. In total, 542 patients diagnosed with acute urticaria and/or angioedema during the study period in the clinics were enrolled in the study. Only consented patients aged 18 years and over with clinically diagnosed acute urticaria, angioedema, or both were included in the study. Those patients who had chronic urticaria, autoimmune diseases and were pregnant or lactating were excluded from this study.

Data collection was performed using patient medical records, and the following information was gathered: name and age of the patient, gender, clinical manifestations, possible cause if determined, and therapy applied, and result of this treatment. Patients were categorised into two groups based on the treatment protocol administered: These include Protocol A, antihistamines and corticosteroids, and Protocol B, antihistamines only. In other instances of angioedema or anaphylaxis, epinephrine was also given. The outcomes taken for the study were time to recovery from symptoms, relapse rates, rate of hospitalizations and side effects of the treatments.

Analysis was carried out using the statistical package of social sciences software (SPSS) version [X]. Continuous data was presented as means age and standard deviations, while categorical data was presented as frequency and proportions. Structural and instrument variables were analysed using the Chi square test and independent‘t’ test, respectively, for categorical and continuous variable data. The descriptive measures and comparison of various groups were obtained at a significance level of 0.05 or below to make the results more meaningful.

3. Results

This study comprised 542 patients with acute urticaria and/or angioedema visiting the Emergency Department of Lady Reading Hospital, Peshawar. The demographic data, clinical characteristics and outcome of these patients have been reviewed and compared depending on the treatment modalities employed.

3.1. Patient Demographics

Of the total 542 patients, 290 patients were female, and 252 patients were male. The mean age of the patients was 34.7 (± 12.8 years); out of them, 18-75 years. Most patients, 312 (57.6%), were aged between 20 and 40 years. that demographically there was no difference in the age of patients between the two treatment groups. Details of age and gender allocation to the different groups are presented in Table 1.1.

Table 1 Demographic Data of Patients

Gender	Number of Patients	Percentage
Female	290	53.5
Male	252	46.5

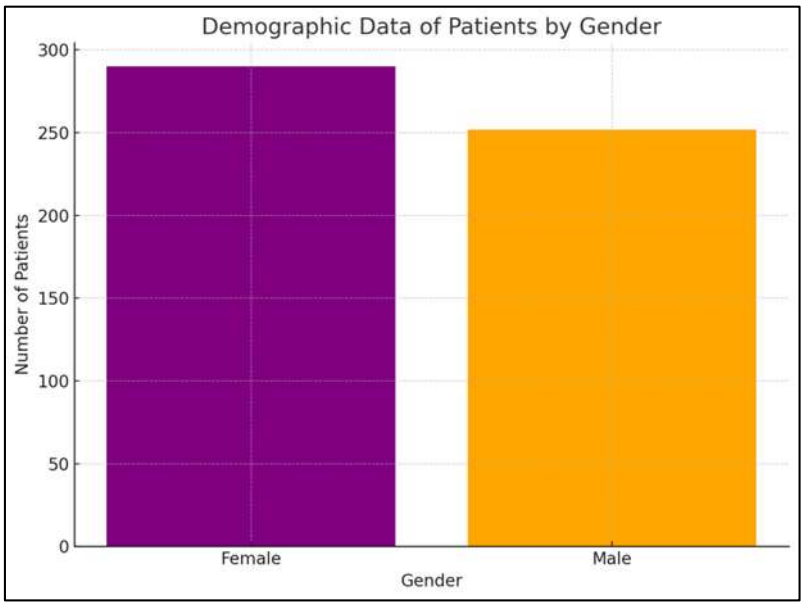

Figure 1 Demographic Data of Patients

3.2. Clinical Presentation

The patients were classified according to the presenting skin symptoms; 312 patients had urticaria alone, 128 patients had angioedema alone, and 102 patients had both symptoms. Regarding the activating factors, 225 of patients (41.5%) indicated recent use of drugs (principally antibacterial and non-steroidal anti-inflammatory drugs); 134 patients (24.7%) indicated food allergy; 98 patients (18.1%) indicated environmental allergens; and 85 patients (15.7%) indicated no activating factors. Interestingly, no differences were observed in the baseline clinical characteristics in the two groups, including presenting symptoms of patients whether in the emergency department or not.

3.3. Treatment Protocols

3.4. The patients were split into two groups depending on the extent of the treatment they underwent. Out of 542 patients, 280 were given a combination of antihistamines like cetirizine and corticosteroids like prednisolone, and 262 patients were given only antihistamines. Out of 542 patients, 58 (10.7%) patients required intramuscular epinephrine for severe angioedema or suspicion of anaphylaxis.

3.5. Symptom Resolution Time

The main endpoint was time to symptom resolution. Group A had a mean time to symptom resolution of 3.6 hours (±1.2 hours), while Group B had a mean resolution time of 5.1 hours (±1.8 hours). Parents were asked about the time during which the symptoms were relieved from Through ANOVA, it was found that the results were statistically significant ($p < 0.001$). This shows that the patients who were administered with both antihistamines and corticosteroids relieved their symptoms faster than the patients who were only given antihistamine.

3.6. Recurrence of Symptoms

We also looked at whether the symptoms recurred within 48 hours; if they did not, then the participants were asked if they could relocate to a section that had no wind. This was seen in Group A, where 42 patients renewed disease, and in Group B, where 78 patients renewed symptoms. An analysis of the data has shown that the rate of the recurrence and

the rate of the control group are statistically significant but insignificant (p < 0. 01). These results indicate that all the corticosteroids also offered not solely a quicker duration of the symptoms but also fewer symptoms recurrence in the short term.

3.7. Hospitalization

Of the 540 patients, 78 (14.4 percent) required additional inpatient care. In Group A, only 28 patients (10%) were admitted; in contrast, 50 patients (19.1%) in Group B were admitted. This outcome was statistically significant, thereby presenting more possibility of hospitalisation for patients in Group B than in Group A administered with corticosteroids plus antihistamines. Mortality rates among patients with ND relations by stage were as follows: thirty-four point nine percent of hospitalisations were for disease that could not be managed clinically at the outpatient or emergency care level, including new disease or recurrent or worsening symptoms.

Table 2 Outcomes by Treatment Group

Outcome	Group A (Antihistamines + Corticosteroids)	Group B (Antihistamines alone)
Symptom Resolution Time (hrs)	3.6	5.1
Recurrence (%)	15.0	29.8
Hospitalization (%)	10.0	19.1

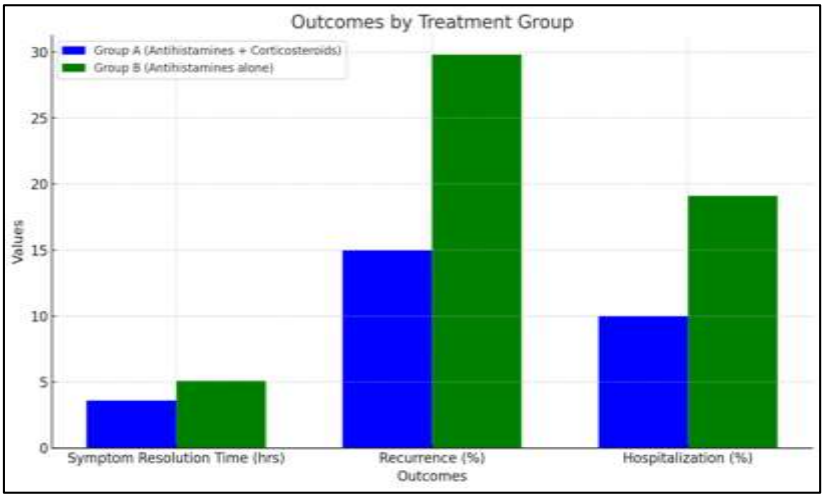

Figure 2 Outcomes by Treatment Group

3.8. Use of Epinephrine

Among the 58 patients who needed epinephrine, all but 6 were described as having significant facial and neck swelling and some, specifically, lip and pharyngeal swelling with signs of airway obstruction. These patients well responded to epinephrine, and none received intubation or any advanced airway intervention. However, 12 patients (20.7%), who were treated with epinephrine, required admission for further observation because of reinstitution of reaction and/or delayed anaphylactic reaction.

3.9. Statistical Significance

While SCs added to AHs were generally superior to AH therapy alone in terms of efficacy in controlling symptoms and disease recurrence, the reduction in hospitalisations' impact provided the primary advantage. Statistical analysis for these observations included the use of P < 0.05 as the level of significance for all the core results obtained.

4. Discussion

Therefore, the present study was designed to compare the efficacy of various treatment strategies in view of patients with acute urticaria and/or angioedema being seen in the ED. In comparing the clinical profile of patient samples from Group A who received both antihistamine and corticosteroid therapy to the patient samples from Group B who were given only antihistamines, the paper underscores the need to use corticosteroids as adjunctive therapy in the management of urticaria to hasten symptom resolution and reduce first recurrence and hospitalisation rates. The present research adds to the body of knowledge on how these two frequent allergic reactions can be managed in the clinic, which can be of use in the field of practical medicine in emergencies.

4.1. Symptom Resolution

The findings of this study suggest a significant improvement in the duration it takes before patients' symptoms resolve for those who were prescribed both antihistamines and corticosteroids. Group A patients witnessed their symptoms alleviated within an average time of 3.6 hours, while Group B took 5.1 hours on average to see their symptoms reduce. This result is similar to earlier studies that show that the use of corticosteroids together with antihistamines gives faster symptom improvement in patients with acute urticaria and angioedema (Godse, 2016). Corticosteroids act by reducing inflammation through repression of cytokine formation and a decrease in activation of mast cells, which is important in modulating histamine and other mediators of inflammation used in these conditions (Maurer et al., 2017). As a result, the observed more rapid clearance of the symptoms in Group A may be explained by the fact that corticosteroids have an anti-inflammatory effect, which, in combination with an antihistamine, has a more pronounced effect on the symptoms.

4.2. Recurrence of Symptoms

Another important implication of this study is that Group A had a lower recurrence rate compared to Group B. Group A patients showed a recurrence of symptoms in 15 of 100 in 48 hours as compared to 29 of 100 patients in Group B. This result goes a long way in supporting the assertion that while corticosteroids, when used along with antihistamines, give faster relief, they are likely to help prevent relapse as well. This may be attributed to the ability of corticosteroids to provide anti-inflammatory effects throughout the delayed phase of allergic reactions and be useful as monotherapy in patients with severe UR and AE manifestations (Zuberbier et al., 2018). Refractory is usually an issue in the management of such ailments because inadequately treated or untreated inflammation will lead to the reappearance of wheals or swelling after early amelioration (Schaefer et al., 2017).

Other comparative studies have also highlighted corticosteroids in sparing recurrence rates, especially in clients with recurrent or chronic urticaria (Gowda et al., 2019). However, the regular use of corticosteroids is still a matter for debate, especially concerning cases of mild urticaria where the likely side effects would appear to be more damaging than useful. Based on the findings of this study, the overall incidence of ADR's in this population seems relatively low, and the indicated benefits of corticosteroids in avoiding relapse and enhancing the control of symptoms would seem to outweigh the risk in the acute management of moderate to severe cases in the ED.

4.3. Hospitalisation Rates

The result of the study also showed that the two treatment groups differed markedly on the proportion of participants hospitalised to the hospital at one point in time. A total of 10 patients in Group A and 19.1 in Group B had to be admitted to the hospital. These differences indicate that when corticosteroids are included in the management of inflammatory bowel disease, both clinical outcomes as to symptom and recurrence and costs, not only from symptoms and further inpatient care, are optimised. This conclusion perhaps holds significant practical concerns for emergency departments, where congestion and severe constraints on resources are becoming known realities (Maurer and Moser, 2017). This may in turn help with the capacity of emergency services: fewer people finally admitted will need to be hospitalised should careful use of corticosteroids reduce hospitalisation rates in the right case mix.

The differences in the proportion of hospitalisation could also be accounted for by better control of symptoms and recurrence rates of the patients in Group A; patients who achieved speedy and lasting relief are less likely to need further monitoring or medical admission. Zuberbier et al. (2018). It needs to be done especially in cases of localised or angioedema where the risk of airway is likely to present major complications. The present findings also indicated that fewer patients in Group A needed to be admitted for recurrent or aggravated symptoms, which prevents corticosteroids from successfully preventing symptoms from escalating to a stage that necessitates hospitalisation, such as in Group B.

5. Conclusion

The findings of this study make a contribution to the current knowledge regarding the comparative efficacy of various treatment strategies for acute urticaria and angioedema in an emergency department. It is clear, therefore, that patients who were in the multi-drug intervention group (Group A that took antihistamines and corticosteroids) had better clinical outcomes when compared to those in Group B that took only antihistamines. In particular, patients who have been treated with both these methods noted improved speeds of resolution of symptoms, as well as a decrease in the frequency of the relapse of the disease and a lower tendency to be hospitalized. These observations imply that corticosteroids are useful in treating the inflammatory aspects of such disorders and are most relevant in treating patients with moderate to severe manifestations.

Both treatment strategies were generally safe; however, our findings suggest that although the addition of corticosteroids caused only a slight increase in gastrointestinal symptoms, physicians should exercise more care in their use, particularly in patients who are at higher risk for side effects. Nevertheless, it should be noted that the potential advantage in the usage of corticosteroids as an additional element of the treatment scheme seems to overweigh the possible adverse effects, which, in turn, is associated with a decreased pressure on the emergency departments due to the reduced number of hospitalisations and patients' turnover.

These results should be examined in future multicentre prospective trials, as the study is conducted with a number of limitations, including retrospective design and single-centre experience. However, according to the findings of the present study, corticosteroids may also be recommended to be made a component of first-line therapy for acute urticaria and angioedema in emergency situations due to the effectiveness suggested by the studies in moderating the symptoms and preventing recurrence. Subsequent research should focus on refining treatment plans for these regular allergic conditions and fine-tuning the management protocols to provide ideal recommendations that would usher in enhanced clinical care for patients with these entities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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