Current Approaches to Drug and Food Allergy Labels in Patients Hospitalized in General Surgery Wards: Red Wristband Application

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Abstract

BACKGROUND AND OBJECTIVES: Correctly identifying drug and food allergies in hospitalized patients is important to prevent unwanted allergic reactions or unnecessary treatment changes. In this study, we aimed to investigate the effects of the frequency of drug and food allergies in all patients hospitalized in the general surgery department during a one-year period on our approach in clinical practice. **METHODS:** In our single-center, retrospective study, all patients admitted to general surgery services between 01.01.2023 and 31.12.2023 were included. Patients who were given an identifying red wristband and had allergy information on their digital patient card panel were included in the study. Patients with repeated hospitalizations within the total number of patients were included in the study as one patient. **RESULTS:** Data of 5810 patients hospitalized in the general surgery department for one year were scanned. 759 patients with an allergy label were included in the study. Of these, 241 (31.8%) were male, 518 (68.2%) were female, and the mean age was 58.81±15.77 (18-96). Among all hospitalized patients, drug allergy rate was 7.2%, antibiotic allergy rate was 3.8%, and penicillin allergy rate was 2.1%. Food allergy was detected in 1.5% of the total patient group.The most frequently reported allergenic foods were tomatoes, mushrooms, spices, eggs, milk and dairy products, respectively. **CONCLUSION:** We recommend the use of identifying wristbands, such as red wristbands, to ensure that the allergy history of hospitalized patients is correctly questioned and that patients with allergies are labeled. We also believe that protocols for allergy labels should be developed in health centers.

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CONCLUSION: We recommend the use of identifying wristbands, such as red wristbands, to ensure that the allergy history of hospitalized patients is correctly questioned and that patients with allergies are labeled. We also believe that protocols for allergy labels should be developed in health centers.

Key words: Allergic reaction, antibiotic allergy, drug allergy, food allergy, prophylactic antibiotic

Introduction

Drug allergy (DA) is defined as hypersensitivity reactions to drugs mediated by specific antibodies or T lymphocytes. Its epidemiological risk factors are not fully understood and severe symptoms ranging from mild manifestations such as erythema, skin rash, and pruritus to anaphylaxis and mortality may be observed. Underdiagnosis and overdiagnosis are common problems in drug allergy and may deprive patients of optimal drug choices.[1,2] DA may require hospitalization or prolong hospitalization depending on its severity. Adverse drug reactions present a serious problem, affecting 10-20% of hospitalized patients and more than 7% of the general population. Penicillin allergy is the most commonly reported drug allergy, with prevalence ranging from 5% in the general population to 15% in hospitalized patients.[3,4]

Food allergies (FA), similar to drug allergies, can cause symptoms ranging from mild to anaphylaxis. The basis of FA treatment is the avoidance of the allergen and the use of appropriate diet lists. Food-derived substances used to maintain stability or bioavailability during the manufacturing process of medicines may lead to unpredictable allergic reactions.[5]

In hospitalized patients, it is essential to question and record the patient's history of allergy to a known drug in order to prevent a possible medication error. Patients may have extra allergy labels due to vague symptoms that do not correspond to true allergic reactions or lack of information. Occasionally, allergic reactions may occur when patients with allergies are not labeled. An inaccurately defined history of allergy leads to increased use of broad-spectrum antibiotics, increased potential side effects, higher risk of infection by resistant bacteria, increased treatment costs, and prolonged hospitalization. The present study aims to determine the frequency of drug and food allergies in all patients hospitalized in the general surgery service over a one-year period and to investigate the effects of our approach in clinical practice on the treatment process in case of a history of allergy.

Materials and methods

All patients admitted to general surgery services between 01.01.2023 and 31.12.2023 were included in our single-center study conducted in our hospital, which is a tertiary city hospital and the largest health center in the region. Patient data were retrospectively reviewed through the hospital information management system (HIMS) and archival files.

Allergy labeling

A colored wristband application is used in the hospital for the correct identification of patients. All standard patients hospitalized in the health institution are given a white identification wristband, while only patients with a history of allergy are provided with a red colored wristband. Allergy history is questioned by the physician and nurse at the first admission of all patients, and if a history of allergy is present, the patient is given a red identification wristband. In addition, automatic warning screens are activated by entering allergy information on the HIMS patient card panel. Patients reporting a history of allergy are not routinely tested for allergy; decisions are made based on the patient's statement or previous clinical findings.

Drug Allergy: Drugs containing the allergic active ingredient are excluded from prescribing in the HIMS drug order panel. In clinical practice, ciprofloxacins are the first alternative group for patients reporting penicillin allergy. Surgical prophylaxis of patients who report penicillin or cephalosporin allergy is performed with ciprofloxacin due to the risk of cross-reaction. In case of multiple antibiotic allergies, consultation is requested from the infectious diseases clinic, and in case of multiple drug allergies, consultation is requested from the allergy and immunology clinic.

Food Allergy: Patients who report food allergies are requested for consultation with the nutrition and dietetics unit to provide a personalized diet.

Patient groups

After a retrospective review of all patients who were hospitalized in the general surgery services of our hospital during 2023, patients who wore a red wristband and had allergy information on the HIMS patient card panel were included in the study. The patients with repeated hospitalizations were included in the study as one patient in the total number of patients.

Exclusion criteria

Patients with incomplete data were excluded from the study. Patients with a history of food or drug allergies classified as allergic patients due to allergic asthma, seasonal allergy, pollen allergy, etc. were excluded from the main study data. However, they were recorded to provide numbers and percentages to determine mislabeling rates.

Age, gender, history of drug allergy, allergic agent group, presence of food allergy, and allergenic food type were recorded.

Statistical analysis

SPSS 25.0 (SPSS Inc, Chicago, IL, USA) analysis program was used for statistical evaluation of the data. Categorical measurements were summarized as numbers and percentages, and continuous measurements were summarized as mean and standard deviation (median and minimum-maximum where appropriate). The Shapiro-Wilk test was used to determine whether the parameters in the study showed normal distribution.

Ethics

The Local Ethics Committee for Clinical Research (Date:12.06.2024, Decision No:23) approval was obtained for our single-center and retrospective observational study. All procedures were performed in accordance with ethical rules and the principles of the Declaration of Helsinki. Patients are required to sign informed consent forms for the procedures to be performed in the clinic during hospitalization.

Results

For the study, the data of a total of 5810 patients who were hospitalized in the general surgery service for a period of one year were screened, with repeated hospitalizations counted once.

759 patients with allergy labeling were included in the study. Of these, 241 (31.8%) were male and 518 (68.2%) were female, and the mean age was 58.81±15.77 (18-96) years.

During the study period, 13% of the patients hospitalized in the general surgery service were given a red wristband due to a history of allergy. However, allergy labels were also applied to patients who reported allergies to cosmetics, cleaning chemicals, house dust, pollen, and bee stings. The proportion of patients with red wristbands for reasons other than food or drug allergy was 35% of the entire allergy label group (Table 1). The drug allergy rate among all inpatients was 7.2%, the antibiotic allergy rate was 3.8%, and the penicillin allergy rate was 2.1%. In the patient group with allergy labeling, the drug allergy rate was 55.3%, the antibiotic allergy rate was 29.1% and the penicillin allergy rate was 16.3% (Table 2).

Food allergy was 1.5% in the total patient group and 12.1% in the allergy label group. The most frequently reported allergenic foods were tomatoes, mushrooms, spices, eggs, milk, and dairy products (Table 3). 12 patients had a history of both food and drug allergy. Of these, 5 patients with fungal allergy were also allergic to penicillin. A patient with a known history of magnetic resonance imaging (MRI) contrast agent allergy developed an anaphylactic reaction to computed tomography (CT) contrast agent and subsequently died. During hospitalization, no adverse allergic reactions were reported in the other patients included in the study.

Discussion

Our study presents the results of a detailed analysis of both food and drug allergy rates in our general surgery clinic, which has a high-volume patient cycle. In the literature, the number of publications that address food and drug allergies together is very limited. Although the number of patients with both food and drug allergy labeling was small, it was notable that the co-occurrence of fungal and penicillin allergy was high.

As in our study, individual drug allergens are reported to be significantly more prevalent in female patients in many studies. In addition, a history of drug allergy has been reported more frequently in elderly patients due to the burden caused by polypharmacy.[6,7] In a similar study conducted with a similar number of patients to our study population, the rate of penicillin allergy was found to be 4.6% in 5529 hospitalized patients. This rate was found to be 2.1% in our study. However, we did not perform allergy or confirmation tests on any of the patients. In the literature, confirmation testing and proposing studies have become increasingly important in recent years. Steenvoorden et al. reported that penicillin treatment was administered safely in 42% of patients who reported penicillin allergy after oral penicillin testing.[8] In patients with a penicillin allergy label, the actual penicillin hypersensitivity rate is less than 5%. The possibility of cross-reaction between penicillins and cephalosporins is extremely low (1-2%). However, if penicillin allergy is present, most surgeons avoid cefazolin in surgical prophylaxis for fear of cross-reaction. This should be considered as a surgical tradition that has no scientific basis since studies have shown that cefazolin is safer than other cephalosporins due to a different heterocyclic ring in its pharmacological structure.[9] In the general surgery clinic where our study was performed, ciprofloxacins are preferred for surgical prophylaxis in patients with penicillin or cephalosporin allergy labels. This is mainly because ciprofloxacin is considered safer. However, Hartinger et al. reported that neurotoxicities and other serious adverse effects related to ciprofloxacin were observed in their study.[10]

Στυδιες ηαε σηοων τηατ συργιςαλ σιτε ινφεςτιονς ηαε ινςρεασεδ δυε το τηε δεςρεασε ιν τηε υσε οφ ςεφαζολιν φορ περιοπερατιε προπηψλαξις ανδ τηε πρεσςριπτιον οφ αλτερνατιε αντιβιοτιςς το β-λασταμς. Πατιεντς ωιτη ρεπορτεδ πενιςιλλιν αλλεργψ αρε οφτεν τρεατεδ ωιτη αλτερνατιε αντιβιοτιςς τηατ αρε βροαδερ ιν σπεςτρυμ, μορε τοξις, ανδ μορε εξπενσιε. Ονε στυδψ φουνδ α 69% ινςρεασε ιν τηε ριςκ οφ μετηιςιλλιν-ρεσιστανt *Σταπηψλοςοςςυς αυρευς (ΜΡΣΑ)* ανδ α 26% ινςρεασε ιν τηε ριςκ οφ ". *διφφιςιλε* ινφε-

στιον δυε το τηις σονδιτιον.[11,12] Τηερεφορε, ιτ ις οφ ινσρεασινγ ιμπορτανσε το περφορμ σονφιρματιον τεστς ιν πατιεντς ωηο ρεπορτ α ηιστορψ οφ αλλεργψ. Τηις ις συππορτεδ βψ τηε στυδψ σηοωινγ τηατ ουτ οφ 460 πατιεντς ρεπορτινγ πενιςιλλιν αλλεργψ, ονλψ 17 πατιεντς (3.7%) ηαδ α ποσιτιε αλλεργψ τεστ.[13] Ιν ανοτηερ στυδψ ιν ωηιςη α σονφιρματιον τεστ ωας περφορμεδ, ιτ ωας φουνδ τηατ τηε υσε οφ σεφαζολιν ινσρεασεδ βψ 18%, ωηιλε τηε υσε οφ ανσομψςιν ανδ σλινδαμψςιν δεσρεασεδ σιγνιφιςαντλψ.[14] Ιν ουρ στυδψ, νο πατιεντ υνδερωεντ α σονφιρματιον τεστ ορ αλλεργψ τεστ ας τηερε ωας νο σπεςιφις προτοςολ ιν ουρ ηοσπιταλ. Ονλψ πατιεντς ωηο ρεπορτεδ μυλτιπλε δρυγ αλλεργιες ωερε ρεγιστερεδ φορ φολλοω-υπ ατ τηε αλλεργψ ανδ ιμμυνολογψ σλινις αφτερ δισσηαργε.

After antibiotics, painkillers are the most common cause of drug allergies. Among painkillers, nonsteroidal anti-inflammatory drugs (NSAIDs) are the most commonly reported subgroup as shown in many studies. Paracetamol and opioids are among the other most common painkiller allergies. In a study of 2431 unique patients, NSAID allergy was reported in 20.7% and paracetamol allergy in 5.3%.[7] Furthermore, a study evaluating adverse drug reactions of NSAIDs emphasizes the frequency of side effects of this drug group other than allergy.[15] The NSAID allergy subgroup constituted 52.7% of the 26.7% painkiller allergy group in our study. Moreover, paracetamol was recorded in 19.6% and metamizole sodium (Novalgin®, Sanofi Ilac A.S., Turkey) in 21.4%. We believe that the high prevalence of metamizole sodium allergy, especially in the elderly group, may be related to the frequent use of this drug by primary care physicians in the past.

Reports of allergy to proton pump inhibitors (PPIs), one of the most commonly used drug groups for both treatment and prophylaxis, are becoming increasingly common. In a study, lansoprazole was reported to be the most common and rabeprazole was reported to be the subgroup with the least allergy history in the PPI group.[17] However, we assume that the main reason for this result is the frequency of prescription rather than the pharmacologic differences of the PPI subgroup. In our study, PPI allergy accounted for 2.3% of drug allergies.

In the past, radiologic contrast media (RCM) were one of the most frequently reported groups of allergic reactions. With the introduction of non-ionic, low-osmolar agents, allergic reactions to these agents have declined from 12% to 0.04%. Reactions to gadolinium used in MRI scans are much lower than reactions to RCMs used in CT scans. Although reports of allergic reactions to these agents have decreased, drug reactions leading to fatal anaphylaxis can be observed.[16,17] In our study, CT drugs constituted the majority of imaging agent allergy histories. One of our patients with a history of gadolinium allergy developed anaphylaxis after the use of a CT drug and died. This suggests that the history of allergy in these groups should be questioned more carefully.

Fatal anaphylaxis due to allergies is fortunately quite rare. In a comprehensive study, it was emphasized that mortality for drug-induced anaphylaxis was estimated to be 0.05-0.51 per million people and 0.03-0.32 for food-induced anaphylaxis. It was reported that peanuts or tree nuts account for half of deaths from food-induced anaphylaxis.[18] Therefore, although most studies have focused on drug allergies, food allergies are also a major burden on the healthcare system. Both directly consumed foods and foodborne allergens in medicines are the causes of FA. Since propofol, used in anesthesia, contains soybean oil and egg lecithin, it should be administered with caution to patients with allergies to these foods.[5] In another study investigating the prescribing habits of anesthesiologists in the presence of egg, soy, and hazelnut allergies, only 32% of the participants stated that they would avoid propofol in the presence of these specific food allergies.[19] In our study, egg allergy was present in 8.6% of the patient group reporting food allergy. However, no information on the use of an agent other than propofol or an adverse event was found in the anesthesia records.

One of the biggest challenges with allergy labeling is that some of the symptoms that patients

describe as allergies may not actually be allergy symptoms. There are studies reporting that the reporting of drug allergy is higher in patients with a history of chronic urticaria and atopy (20). A similar issue was encountered in our study. The patients with allergy labels for reasons other than food or drug allergy accounted for 35% of the entire allergy label group. Thomas et al. reported that red wristbands were used to indicate the presence of allergy in 112 (52.6%) of 213 centers in their prospective multicenter study.[20] Similar to our center, in these centers, the red wristband did not contain the details of the allergen or reaction and was applied only as a warning.

Our study had some limitations due to its retrospective nature and the inclusion of patients admitted to only one clinic in a single center. The main limitations were the lack of any confirmation test for allergies in patients with allergy labels and the lack of an institutional protocol for these patients. In addition, the lack of records of allergic reactions encountered in inpatients and the fact that it was not known whether any tests were performed for allergies after discharge were also weaknesses of our study.

Despite all these, we find it valuable to thoroughly detail the rates of both drug and food allergies among all patients admitted to general surgery services within the one-year period of our study. We believe that the results of this study will serve as a guide for changing the traditional practices of perioperative antibiotic prophylaxis in patients labeled with allergies. Additionally, we hope that the allergenic food sub-analysis related to food allergies in our study will encourage the use of personalized dietary treatments.

Conclusion

Accurately inquiring about the allergy histories of hospitalized patients and labeling those with allergies is crucial for preventing potential adverse allergic reactions. Patients' allergy statuses should be communicated through both identifying wristbands, such as red wristbands, and alert systems on digital patient records. We believe that educational programs should be implemented to increase the knowledge levels of both patients and healthcare professionals regarding allergy labels and that protocols related to allergy labeling should be developed in healthcare facilities.

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