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SARS-CoV-2 vaccine administration allergic reaction management

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INTRODUCTION

The development and results of vaccines against the new Sars-CoV-2 pandemic received special attention of the scientific community, which manifested itself in a scrutiny of the various aspects of the vaccine, particularly safety and efficacy[1]. The notable introduction to a new vaccine development's method has taken place, basing its immunogenicity in the inoculation of a produced RNA messenger (mRNA) that is translated in the cell nuclei into the viral protein epitope capable of triggering cellular and humoral antigen presentation on the patient[2]. This technology is used as base for the vaccines presented by companies such as Pfizer-Biontech and Modena[3].

A relevant aspect for safe immunization public policy, as widely discussed among sanitary authorities in the US and the UK, seems to be the hypersensitivity allergic reaction to the vaccine[4]. The adverse effects are an important concern specially once they may manifest themselves in an medical emergency, such as anaphylaxis, which the prevalence as immune response to any allergen is estimated to be around 3% to 5% in Western countries[5].

Several articles have introduced allergic reaction as the main challenge to vaccine development while in lab animal testing phases[6] and it have been well established that the main concern to the more severe SARS cases is due to the explosive cytokine storm as immune response to the virus[7]. Thus, it seems reasonable that counter indications be investigated as well as the safest means for vaccine administration, particularly the unprecedented mRNA based, so that it is possible to mitigate the adverse effects of the process[8].

METHOD

Several health care data banks were researched, majorly American-based such as PubMed, Medline and PMC, usually in simple search having selected options “AND" and “OR" in selection boxes whenever they were present, published up to the present date, filtered by “sars cov 2 vaccine”, “vaccine allergy sars cov 2”, “therapeutics sars cov 2” and “covid 19 update”. The articles were selected based on citation numbers and relevance to the review purpose. There have been no restriction filters by theme, medical subject or language.

DISCUSSION

Lab volunteer testing conducted before the mRNA vaccines submission to sanitary authorities have always reported mild or moderate adverse effects observed after proper administration. The frequency reported reached around 21% of patients feeling tiredness, headaches, chills, myalgia and pain around the injection site[9]. The great importance of immune hypersensitivity responses to the Sars-Cov-2 vaccine did not go unnoticed by the scientific community and have been widely confirmed as the endeavor's priority along with efficiency preventing the disease[10].

Since the first vaccination campaign started in the UK on December 2020 there have been observed two cases of anaphylaxis following administration in the second day of Pfizer-Biontech’s program[11]. In the next few following days, eight more cases of anaphylaxis were reported in the American program after the same vaccine administration[12]. After these episodes, the British sanitary authority (MHRA) issued a general statement that counter indicated vaccine administration for patients “with significative allergic reaction history”[13].

A wide array of variables go by unnoticed and untested in an emergency vaccination regime, which can be observed by the disproportion of the stated in lab testing trials and the adverse effects present through the actual public vaccination program. It have been estimated that in some patients would be better off facing the natural process of Sars-CoV-2 infection than facing the rejective immune response against the mRNA vaccine, which is fairly misunderstood[14], that added to the fact that Sars-CoV-2 has its worse development cases leading to the patient’s death mainly due to

immune response hyperactivity[15], even though this may be an overstatement against the vaccines, due to the minuscule prevalence of adverse effects.

Some predispositions to the more severe forms of SARS are present in groups affected by other pathologies with consistent correlation to anaphylaxis, the most serious complication observed in the vaccination program. Asthma patients, who were early treated as a high risk group to the virus have strong predisposition to developing anaphylaxis immune responses[16], as well as patients with mastocytosis[17], even though the latter were not mentioned on the sanitary authorities' reports.

Another widely discussed topic seems to be the efficacy of child vaccination, since their transmission capacity remains a debatable issue and as they usually develop mild cases, compared to elderly patients[18]. The concern with allergic response is particularly due to child's immunity being notably immature, thus more sensible[19]. However, a concern focused on anaphylaxis as response to vaccination in children seems unjustified, given there wasn't observed any prevalence at all for hypersensitivity of the kind among patients with different ages[20].

Few conclusions were drawn as to the what is specifically the allergen amid the vaccine compounds. Up until now, it seems that polyethylene glycol (PEG), a common polymer widely used in cosmetic, food and drug industries might be the immunogen responsible for the adverse reactions observed[21]. In spite of broadly spread everyday usage, PEG has been described as "an occult allergen in drugs and food that may induce allergic reactions that can be difficult to detect by health care staff" and even in cutaneous allergy tests, PEG has shown unforeseen hypersensitivity reactions, characterized specially by anaphylaxis[22].

CONCLUSION

As public confidence has grown as a scientific concern regarding vaccination success, in Brazil as well as in other countries[23], it is important to show the best efforts to control adverse reactions to the vaccine.

Anaphylaxis, which is the more severe hypersensitivity reaction observed to the new vaccines, is also a medical emergency. Nevertheless, it is a easily manageable emergency for a well

trained medical staff equipped with necessary drugs and material. In order to manage anaphylaxis following vaccine administration as well as possible, it seems reasonable to establish a special attention group which would be better treated if vaccinated inside hospitals and moderately complex medical facilities, as it is recommended for procedures with such risk.

The literature suggests that patients with drug or PEG allergy history, asthma, mastocytosis and other conditions that predispose hypersensitivity leading to anaphylaxis be treated with special care and would safer if in the hospital when vaccinated.

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