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Conference Paper

Post-vaccination Symptoms with Second Dose of AstraZeneca in a Sample of Immunized Population of Ecuadorian Public Servants

Síntomas pos-vacuna con segunda dosis de AstraZeneca en una muestra de población inmunizada de Servidores Públicos Ecuatorianos

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IX CONGRESO INTERNACIONAL DE INVESTIGACIÓN DE LA RED ECUATORIANA DE UNIVERSIDADES Y ESCUELAS POLITÉCNICAS Y IX CONGRESO INTERNACIONAL DE CIENCIA TECNOLOGÍA EMPRENDIMIENTO E INNOVACIÓN SECTEI-ESPOCH 2022

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Abstract

Since AstraZeneca is a new vaccine against SARSCOV2, it should be monitored worldwide. This study presents the adverse reactions caused by the second dose of the AstraZeneca vaccine. Thequantitative, descriptive, cross-sectional research used a validated survey conducted on 428 public staff who were vaccinated with the second dose of the ChAdOx1-S vaccine at the Escuela Superior Politécnica de Chimborazo, the results were processed in Jamovi. 289 respondents reported having symptoms after inoculation, women (13.15%) presented more symptoms than men (7.27%). Most of the symptoms, both local and systemic, were mild and subsided with the administration of oral analgesics and lasted up to three days in 50% of the cases. AstraZeneca's vaccine proves to be a safe biologic vaccine to generate antibodies against SARSCOV" in the adult population, and its use is therefore recommended.

Keywords: *drug-related side effects and adverse reactions, coronavirus infections, pharmacovigilance.*

Resumen

Introducción: Dado que se trata de una nueva vacuna contra el SARSCOV2, debe ser monitoreada a nivel mundial, el presente estudio presenta las reacciones adversas presentadas con la segunda dosis de la vacuna AstraZeneca. Materiales y Métodos: La presente investigación cuantitativa, descriptiva, transversal, utilizó una encuesta validada aplicada a 428 funcionarios públicos que fueron vacunados con la segunda dosis de la vacuna ChAdOx1-S en la Escuela Superior Politécnica de Chimborazo, los resultados fueron procesados en Jamovi . Resultados: 289 encuestados informaron tener síntomas después de la inoculación, las mujeres (13,15%) presentaron más síntomas que los hombres (7,27%). La mayoría de los síntomas, tanto locales como sistémicos, fueron leves y cedieron con la administración de analgésicos orales y duraron hasta tres días en el 50% de los casos. Conclusiones: La vacuna de AstraZeneca demuestra ser una vacuna biológica segura para generar anticuerpos frente al SARSCOV" en la población adulta, por lo que se recomienda su uso.

Palabras Clave: *kwd2.*

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1. Introduction

At the end of 2019, an outbreak of a clinical picture characterized by fever, dry cough and general weakness was reported, together with intestinal symptoms occasionally, this occurred in a seafood wholesale market in Huanan, in Wuhan, China. The causative agent of this outbreak was identified as a novel beta coronavirus, which was called New Coronavirus 2019 (2019n-Cov) and the clinical picture was called Coronavirus Disease-2019 (COVID-2019).[1], whose genome is 96% identical to a bat coronavirus, which is why it was speculated that transmission to humans occurred through exotic animals in markets[2]. Given the rapid expansion of the outbreak on January 30, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak as the sixth Public Health emergency of international concern, therefore, this outbreak constitutes a risk for health of international spread and that required coordination of health systems around the world.[3]

At the beginning of the pandemic, Ecuador had the highest rate of people with COVID-19 in South America, 13.15 per 100,000 inhabitants, and exceeded the world average of 9.63. The fatality rate in Ecuador of 3.40% was close to the world average of 4.80%. The provinces of Guayas, Galápagos, Cañar, and Sucumbíos had the highest morbidity rates from COVID-19 in the country, which exceeded the world average.[4]

To deal with this pandemic, vaccines were developed in record time, based on the sequence of Coronavirus 2, of Severe Acute Respiratory Syndrome (SARS COV2), which, added to the experience of previous decades in their design, using adenovirals, messenger RNA (mRNA) and inactivated whole viruses[5], will act by generating cellular and humoral immunity. The accepted and available vaccines in Ecuador are: Pfizer/BionTech with mRNA, AstraZeneca with viral vectors (Adnovirus), Coronavac from Sinovac and Convidecia/CanSino with inactivated virus.([6,7])

AstraZeneca uses 2 vectors, Ad5 and ChAd (Chimpanzee Adenovirus), gives an important T cell response and has the advantage of preventing pre-existing immunity from rendering the vaccine useless.[8], thanks to the fact that it transports the genetic material necessary to encode protein S inside human cells, with an efficiency between 62.1% and 90%, with an interval between 10 and 12 weeks between the first and second doses.([9–11]). In April 2021, after the application of the first dose of the AstraZeneca vaccine, SARS-COV2 infections decreased by 65%[12]

The Chilean Ministry of Health notified that after the second dose of AstraZeneca there may be two types of local and systemic symptoms. The former are characterized by tenderness, erythema, and pruritus at the puncture site, and the latter include headache,

asthenia, arthralgia, myalgia, nausea, chills, and fever. Both types of symptoms occur in one in 10 people vaccinated.[13]

According to Sabillón et al, the main adverse events identified in their study for the AstraZeneca vaccine were pain in the injected arm, generalized muscle pain, fever, fatigue, malaise, headache, and 7.15% of the patients studied did not presented symptoms.[14]

After vaccination with AstraZeneca, there were mild symptoms such as: muscle aches, headache, increased body temperature, which lasted from 1 to 3 days and in some cases up to 8 days, with severe intensity. The symptoms were alleviated with paracetamol and additional alternative medicine.[fifteen]

There has been a risk of developing thrombotic thrombocytopenia, with an estimate of 1 in 100,000 after the first dose compared to the AstraZeneca vaccine, for which reason the WHO has stated that the sustained situation of viral transmission has presented a greater advantage, for which reason the benefits of the vaccine far outweigh the risks.[16]

The present investigation was carried out with the purpose of evidencing the main symptoms that occurred after the administration of the second dose of the AstraZeneca vaccine, as well as its intensity, duration, and most affected study group, thus contributing to the knowledge of this new vaccine that uses modern technology in the field of immunizations.

2. Materials and methods

The present investigation is of a quantitative, descriptive, cross-sectional type, it was carried out in the public servants of the Escuela Superior Politécnica de Chimborazo (ESPOCH), with the application of a virtual survey, the same one that was validated by experts in internal medicine, pharmacology and health sciences, and included informed consent, was applied 20 days after vaccination. The inclusion criteria of the participants were: that they are a server at ESPOCH, that their vaccine corresponds to the second dose of AstraZeneca and that they have presented post-vaccination symptoms. 428 surveys were obtained, of which only 289 were included in the study because they met the indicated criteria. The results were processed in Jamovi.

The study variables were:

*Demographic variables:*Sex (man – woman), age in completed years, activity in the ESPOCH (teacher, academy support staff, employee, worker).

*Comorbidities and other characteristics:*No risk group, chronic diseases, obesity-overweight, over 60 years, immunological diseases, lactation, thyroid disease, special abilities, tachycardia, brain tumor, amyloidosis.

*Clinical variables:*If they presented post-vaccine symptoms from the second AstraZeneca dose, how do they rate the intensity of the symptoms, how many days did they present post-vaccine symptoms, the symptoms they presented and if they took medication, which one they used.

3. Results

Of the people who received the second dose of AstraZeneca, 52.60% are men and 47.40% women, the majority between 30 and 49 years old, of whom 60.21% are teachers, 16.96% are staff of support to the academy and 16.61% employed among the principals. Of them, 79.24% did not have comorbidities or any characteristic that distinguishes them from the rest, but not 8.65% suffer from a chronic non-communicable disease (hypertension, diabetes and dyslipidemia), 5.19% are obese or overweight, 2.77% are over 60 years old and 1.38% suffer from some immunological disease among the most frequent.

Among those consulted if they presented symptoms with the second dose of AstraZeneca, these were found more in women 13.15% than in men 7.27%. The age group that most presented symptoms was between 35 and 39 years, followed by the groups from 30 to 34 with 3.46% and from 45 to 49 and from 55 to 59 with 3.11% each group. The symptoms occurred more in teachers (11.07%), academy support staff (4.84%) and employees (3.81%). The groups of comorbidities that presented symptoms were chronic diseases, obesity and overweight, patients with immunological diseases, amyloidosis, and thyroid disease.

The intensity of the symptoms was always greater in women in relation to men, and in the same way the majority reported that the symptoms presented were of mild intensity and in 6.77% of the cases it was intense.

When asked about taking medication before getting vaccinated, 12.80% indicated that they did, and in the same way, due to the symptoms they presented, 28.37% took medication. At both times, the medications they took were antipyretics, including paracetamol, acetylsalicylic acid, and ibuprofen. Those who took medication reported having done so related to their background comorbidity.

The main post-vaccine symptoms that they presented are headache, general malaise and fever that add up to 80.52%, the remaining percentage is in symptoms that occurred less frequently chest pain, nausea, chills, stomach upset, sore throat, eye rash, fever,

Tabla 1

Characterization of the people who received the vaccine.

Variable	No.	%
Sex		
Man	152	52.60
Women	137	47.40
Age		
25 to 29	17	5.88
30 to 34	58	20.07
35 to 39	61	21.11
40 to 44	48	16.61
45 to 49	33	11.42
50 to 54	29	10.03
55 to 59	34	11.76
60 to 64	9	3.11
Activity in the ESPOCH		
Professor	175	60.55
Academy support staff	54	18.69
Employee	52	17.99
Worker	8	2.77
Comorbidities and other characteristics		
No risk group	229	79.24
Chronic diseases	25	8.65
Obesity-Overweight	15	5.19
More than 60 years	8	2.77
immunological diseases	4	1.38
Lactation	2	0.69
thyroid pathology	2	0.69
Special capabilities	1	0.35
Tachycardia	1	0.35
Brain tumor	1	0.35
amyloidosis	1	0.35

vomiting, body aches. The symptoms presented more with the first dose than with the second dose and the duration of the symptoms was more frequently between 1 and 2 days (64.40%), reaching in some cases more than 6 days.

4. Discussion

Although the Ebrahim Babaee et al. study on the adverse effects after vaccination of COVID-19 in the Iranian population discriminates the symptoms by vaccine and by dose,

Tabla 2

Presence or absence of symptoms with the second dose of AstraZeneca.

Variable	If you had symptoms n=59	He did not present symptoms n=230
	%	%
Sex		
Man	7.27	45.33
Women	13.15	34.26
Age		
25 to 29	0.69	5.19
30 to 34	3.46	16.61
35 to 39	5.88	15.22
40 to 44	1.73	14.88
45 to 49	3.11	8.30
50 to 54	2.08	7.96
55 to 59	3.11	8.65
60 to 64	0.35	2.77
Activity in the ESPOCH		
Teacher	11.07	49.48
Academy support staff	4.84	12.11
Employee	3.81	12.80
Worker	0.35	2.42
Comorbidities and other characteristics		
No risk group	15.92	63.32
Chronic diseases	1.73	6.92
Obesity-Overweight	1.04	4.15
Immunological diseases	0.69	0.69
Amyloidosis	0.35	0.00
More than 60 years	0.35	0.00
Thyroid pathology	0.35	0.35
Lactation	0.00	0.69
Others	0.00	1.05

if the results they obtained with the second dose of AstraZeneca are compared, they coincide with the present study in which there were more reactions after the first dose, and also the three main symptoms that describe skeletal pain, fever and headache[17]. These symptoms are considered mild reactions and are present with other types of vaccines.

By relating the present study to that of Sang Won Lee[18], which makes a differentiation between local and general symptoms, in relation to the former they coincide and it is the pain at the puncture site, accompanied by sensitivity and induration, not so with

Tabla 3

Symptom intensity with the second dose of AstraZeneca.

Variable	Mild n=29	Moderate n=26	intense n=4
	%	%	%
Sex			
Man	16.95	16.9	1.69
Women	32.20	64.0	5.08
Age			
25 to 29	1.69	1.69	0.00
30 to 34	6.78	10.17	0.00
35 to 39	13.56	11.86	3.39
40 to 44	5.08	0.00	3.39
45 to 49	8.47	6.78	0.00
50 to 54	3.39	6.78	0.00
55 to 59	10.17	5.08	0.00
60 to 64	0.00	1.69	0.00
Activity in the ESPOCH			
Professor	27.12	25.42	1.69
Academy support staff	13.56	6.78	3.39
Employee	8.47	10.17	1.69
Worker	0.0	1.69	0.00
Comorbidities and other characteristics			
No risk group	35.59	37.29	5.08
Chronic diseases	5.08	3.39	0.0
Obesity-Overweight	3.39	1.69	0.00
Immunological diseases	1.69	0.00	1.69
Amyloidosis	1.69	0.00	0.00
More than 60 years	0.00	1.60	0.00
Thyroid pathology	1.69	0.00	0.00
Others	0.00	0.00	0.00

the systemic ones, in which fatigue, muscle pain and chills that, although they were present in the research presented, did not occupy the first places. This difference could be because the genetic characteristics are different. The study that presents similar results to those found in the present investigation is that of Ríos-Gonzales et al.[19]

Leones and Guzmán in their study identified that one of the risk factors for developing adverse effects is being a woman.[twenty], and in the present study it is evident that women are the ones who presented more adverse effects, be they mild, moderate or severe, a similar result was obtained by Hagazi et al. with the first dose.[twenty-one]

Tabla 4

Taking medication before and after the second dose of AstraZeneca.

Variable	Before Getting Vaccinated		After Getting Vaccinated	
	No. %		No. %	
they took medication				
Yeah	37	12.80%	82	28.37%
No	252	87.20%	207	71.63%
Total	289	100.00%	289	100.00%
Medication taken by those who did				
Paracetamol	16	43.24%	71	86.59%
Ibuprofen	4	10.81%	3	3.66%
Acetylsalicylic acid	1	2.70%	3	3.66%
Other	16	43.24%	5	6.10%
Total	37	100.00%	82	100.00%

Contrary to the Becker et al. study on adverse reactions post-vaccination, and possible infection by Covid-19 in dentists, in which three quarters of the sample presented adverse reactions[22], which represents much more than what was found in the present investigation, in which a little more than half of the respondents reported post-vaccine symptoms after the first dose and one fifth after the second. Results that also differ from those found by Galvan-Casas et al., who identified that there were more symptoms with the second dose of AstraZeneca, who also presented rosacea and cellulite.[23], symptoms that the interviewees of this study did not present.

In relation to the severe adverse effects of the AstraZeneca vaccine in patients with comorbidity, the WHO indicates that there were no clinically significant imbalances since less than 1% reported a serious undesirable reaction,[24]which is similar to the present investigation, in which only one patient with immunological disease presented a serious effect, it is for this reason that this vaccine is recommended for people who may have comorbidities such as obesity, cardiovascular disease, lung disease, and diabetes.[25]

5. Conclusions

Most of the adverse reactions, both systemic and local, are mild or moderate, which subside with the administration of analgesics, so the vaccine is considered safe in adults, it counts SARSCOV2 and its use is recommended.

It would be interesting to deepen the reasons why symptoms occur more frequently in women than in men.

Tabla 5

Main symptoms presented and their duration after the second dose of AstraZeneca.

Variable	No.	%
Symptoms		
Headache	3. 4	23.13
Bone/joint pain	26	17.69
Pain at the puncture site	26	17.69
General discomfort	26	17.69
Fever	12	8.16
chest pain	4	2.72
Diarrhea	3	2.04
Dream	3	2.04
Stomach ache	3	2.04
Nausea	3	2.04
Asthenia	2	1.36
Chill	2	1.36
Burning throat	1	0.68
Eye rash	1	0.68
Vomit	1	0.68
At what dose more symptoms		
In both, similar symptoms	11	18.64
first dose	32	54.24
Second dose	16	27.12
Number of days with post-vaccine symptoms		
1	19	32.20
2	19	32.20
3	12	20.45
4	4	6.78
5	3	5.08
More than 6	2	3.39

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Conflict of interests

The authors declare that they have no conflict of interest in the development of this research.

Contribution statement

Tannia Valeria Carpio Arias: Administration of the Ecuacovid Project, conceptualization, research, writing-review and editing.

Rosa Del Carmen Saeteros Hernandez: Project component management, supervision, conceptualization, research, formal analysis, writing-reviewing and editing.

Patricia Herrera Cisneros: Conceptualization, research, writing the original draft, writing-revising and editing.

Gerardo Patricio Inca Ruiz: Visualization. Writing of the original draft, writing-revision and editing.

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