

STOPA POJAVE NEŽELJENIH DOGAĐAJA NAKON VAKCINACIJE KOD PREDŠKOLSKO DECE U DOMU ZDRAVLJA U INĐIJI

ORIGINALNI RAD

ORIGINAL ARTICLE

RATE OF THE OCCURRENCE OF ADVERSE EVENTS IN PRESCHOOL CHILDREN AFTER VACCINATION AT THE HEALTH CARE CENTER IN INĐIJA

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SAŽETAK

Uvod: Neželjeni događaj nakon imunizacije je svaka štetna medicinska pojava koja sledi nakon imunizacije i koja ne mora nužno imati uzročnu vezu sa upotrebom vakcina. Cilj ove studije je bio da se utvrdi stopa pojave neželjenih događaja nakon vakcinacije kod dece predškolskog uzrasta u ustanovi primarne zdravstvene zaštite u Inđiji.

Materijal i metode: Podaci su korišćeni iz medicinske i administrativne dokumentacije Odeljenja pedijatrije u Domu zdravlja Inđija. Istraživanje je obuhvatilo period od 11 godina. Tokom navedenog perioda vakcinisano je 4.273 dece i dato 70.558 doza vakcina.

Rezultati: Ovim istraživanjem smo dobili 13 slučajeva težih neželjenih događaja na vakcinaciju što daje stopu od 18,4:100.000 doza vakcine. Neželjene reakcije na DTP vakcinu imalo je 6 slučajeva na 8.180 doza vakcina što iznosi 73,3:100.000 doza DTP vakcine. Neželjenu reakciju na MMR vakcinu imalo je 7 dece na 8.505 datih doza što daje stopu od 82,3:100.000 doza MMR vakcine. Ukupna stopa postvakcinalnog parotitisa iznosila je 47,0:100.000 datih doza MMR vakcine, postvakcinalne rubele 11,7:100.000 datih doza MMR vakcine i postvakcinalne alergijske reakcije 23,5:100.000 MMR vakcine. Naši rezultati su pokazali dva slučaja neželjene reakcije u vidu alergijske reakcije, na sve date vakcine, što statistički iznosi 3:100.000 doza vakcina.

Zaključak: Ovo istraživanje potvrđuje veoma retku pojavu težih neželjenih reakcija na vakcinaciju i govori u prilog daleko veće koristi od vakcinacije u odnosu na rizik pojave neželjene reakcije na vakcinaciju.

Ključne reči: vakcine, neželjene reakcije posle vakcinacije, alergijska reakcija

ABSTRACT

Introduction: An adverse event following immunization is any undesirable medical occurrence which follows immunization, and which does not necessarily have a causal relationship with the usage of the vaccine. The aim of this study was to determine the rate of occurrence of adverse events in preschool children, after vaccination at the Primary Health Care Center in Inđija.

Material and methods: Data were used from the medical and administrative documentation of the Pediatrics Department in Inđija. The study covered a period of 11 years and during this period 4,273 children were vaccinated, and 70,558 doses of vaccines were administered.

Results: 13 cases of severe adverse reactions to a vaccine were registered, with a rate of 18.4:100,000 vaccine doses. There were 6 severe adverse reactions to the DTP vaccine per 8,180 administered doses of this vaccine, which was a rate of 73.3:100,000 doses of the DTP vaccine. There were 7 cases of severe adverse reactions to the MMR vaccine per 8,505 administered doses of the MMR vaccine, which was a rate of 82.3:100,000 doses of MMR vaccine. The overall rate of adverse reactions in the form of mumps was 47.0:100,000 doses of the MMR vaccine, in the form of rubella rash it was 11.7:100,000 doses of the MMR vaccine and the rate of adverse allergic reactions to the MMR vaccine was 23.5:100,000 doses of the MMR vaccine. According to our results, there were two cases of adverse reactions in the form of allergic reaction, to all vaccines administered, which was the rate of 3:100,000.

Conclusion: This study confirms the very rare occurrence of severe adverse reactions to vaccination and speaks in favor of a far greater benefit from vaccination as compared to the risk of an adverse reaction to vaccination.

Key words: vaccines, adverse reactions after vaccination, allergic reaction

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UVOD

Smanjenjem morbiditeta i mortaliteta od raznih patogena vakcine vrše veliki uticaj na javno zdravlje. Redovni i sveobuhvatni programi imunizacije su imali velikog značaja u iskorenjivanju velikih boginja i u eliminaciji difterije u većini zemalja sveta. Komplikacije koje se javljaju tokom prirodne infekcije su 1.000 do 10.000 puta češće i praćene su težom kliničkom slikom nego pojava komplikacija nakon vakcinacije protiv iste bolesti [1].

Neželjeni događaji težeg stepena nakon vakcinacije javljaju se veoma retko. Malo je verovatno da će neki neželjeni događaji biti otkriveni u kliničkim ispitivanjima pre izdavanja dozvola za korišćenje vakcina, zbog njihove niske učestalosti, ograničenog broja upisanih ispitanika i drugih ograničenja u studiji. Stoga je praćenje neželjenih događaja nakon vakcinacije neophodno. Osnova praćenja bezbednosti vakcina su pregled i analiza spontano prijavljenih neželjenih događaja [2].

Neželjeni događaj nakon imunizacije je svaka štetna medicinska pojava koja sledi nakon imunizacije i koja ne mora nužno imati uzročnu vezu sa upotrebom vakcina [3]. Radna grupa za sigurnost vakcina je svrstala neželjene događaje nakon imunizacije u 5 grupa: 1) reakcije povezane sa proizvodima vakcine; 2) reakcije povezane s nedostacima u kvalitetu vakcine; 3) reakcije povezane sa greškom imunizacije; 4) reakcije povezane sa anksioznošću; 5) slučajni događaji - uzrokovani nečim drugim osim proizvodom vakcine [3].

Klasifikacija postvakcinalnih reakcija prema vremenu pojavljivanja je takođe izuzetno važna za bolje razumevanje njihove prirode: 1) neposredni tip - javlja se u roku od nekoliko minuta, do najkasnije 4 sata nakon davanja vakcine; 2) odgođeni tip - javlja se satima do nekoliko dana kasnije (i do 2 – 3 nedelje) nakon vakcinacije [4].

Lokalne reakcije na mestu davanja vakcine javljaju se kod 25 – 50% vakcinisanih, a blage sistemske reakcije viđaju se kod oko 50% vakcinisanih [5].

Zakonom je predviđeno obavezno prijavljivanje neželjenih reakcija posle imunizacije nadležnom stručnom timu za trajne kontraindikacije u Zavodu za javno zdravlje i Agenciji za lekove i medicinska sredstva, a stručni tim odlučuje o trajnoj kontraindikaciji za datu vakcinu [6].

Cilj ove studije je bio da se utvrdi stopa pojave neželjenih događaja nakon vakcinacije kod dece predškolskog uzrasta u ustanovi primarne zdravstvene zaštite u Indiji.

INTRODUCTION

By decreasing morbidity and mortality from different pathogens, vaccines have a great influence on public health. Regular and comprehensive immunization programs have had great significance in the eradication of smallpox and the elimination of diphtheria in most countries of the world. Complications occurring during natural infection are 1,000 to 10,000 times more frequent and are accompanied by a more severe clinical presentation than the occurrence of complications after vaccination against the same disease [1].

Severe adverse events upon vaccination occur very rarely. Due to their low frequency, the limited number of registered test subjects and other limitations of studies, for certain adverse events, it is highly unlikely that they will be discovered during clinical testing before the issuance of permits for vaccine application. This is why monitoring adverse events after vaccination is necessary. The basis of monitoring the safety of vaccines is the review and analysis of spontaneously reported adverse events [2].

An adverse event following immunization is any undesirable medical occurrence which follows immunization, and which does not necessarily have a causal relationship with the usage of the vaccine. [3]. The Working Group on Vaccine Safety has categorized adverse events after immunization into 5 groups: 1) vaccine product-related reactions; 2) vaccine quality defect-related reactions; 3) immunization error-related reactions; 4) immunization anxiety-related reactions; 5) coincidental events – caused by something other than vaccine components [3].

The classification of postvaccine reactions by the time of occurrence is also of great significance for the understanding of their nature: 1) immediate type – occurs within several minutes to a maximum of 4 hours after vaccine administration; 2) delayed type – occurs a number of hours to several days (up to 2 – 3 weeks) after vaccination [4].

Localized reactions at the vaccine injection site occur in 20 – 50% of vaccinated individuals and mild systemic reactions are registered in around 50% of the vaccinated individuals [5].

The law stipulates mandatory reporting of adverse reactions upon immunization to the relevant expert team for permanent contraindications at the Institute of Public Health and to the Medicines and Medical Devices Agency, while the expert team is the one deciding on permanent contraindications of the given vaccine [6].

The aim of this study was to determine the rate of occurrence of adverse events after vaccination in pre-school children immunized at the primary health care center in Indija.

MATERIJALI I METODE

Istraživanje je sprovedeno kao studija preseka, korišćenjem podataka iz medicinske dokumentacije Odeljenja pedijatrije u Domu zdravlja Indija. Na Odeljenju se uredno vodi vakcinalni karton za svakog pacijenta. Analizirani su podaci iz posebnih protokola evidencije o neželjenim efektima vakcinacije, redovan protokol vakcinacije i izveštaji vakcinacije za period od januara 2009. do decembra 2019. godine.

Na odeljenju pedijatrije Doma zdravlja u Indiji sprovodi se aktivna imunizacije lica određenog uzrasta prema Pravilniku o Programu obavezne i preporučene imunizacije stanovništva protiv određenih zaraznih bolesti, osim kod onih lica kod kojih su utvrđene trajne kontraindikacije. Zarazne bolesti protiv kojih se sprovodi obavezna aktivna imunizacija lica određenog uzrasta su: tuberkuloza, difterija, tetanus, dečja paraliza, veliki kašalj, male boginje, rubela, zauške, hepatitis B, oboljenja izazvana hemofilusom influence tip B, i oboljenja izazvana streptokokom pneumonije [6].

Ovo istraživanje je uključilo pojavu težih neželjenih reakcija na vakcine, bez uključivanja postvakcinalne povišene temperature, otoka i hiperemije na mestu ubrizgavanja, razdražljivosti i sl., koji spadaju u lakše postvakcinalne reakcije i javljaju se kod više od 1 na 10 dece koja primaju vakcinu.

Podaci su uneseni i grupisani u tabelama programa *Microsoft Word*, a statistička obrada je urađena u vidu apsolutnih i relativnih učestalosti.

REZULTATI

Naše istraživanje je obuhvatilo period od januara 2009. do decembra 2019. godine, a tokom navedenog perioda vakcinisano je ukupno 4.273 dece predškolskog uzrasta. Ukupan broj datih doza vakcina je iznosio 70.558. Obuhvat vakcinacije u Opštini Indija ispunjava ciljeve nacionalnog programa imunizacije, odnosno, u ovom periodu, svake godine obuhvat je bio preko 96%. U **Tabeli 1** prikazan je broj dece koja su vakcinisana određenom vakcinom i broj datih doza po određenoj vakcini u istraživanom periodu.

Teže neželjene reakcije na vakcine koje su prijavljene i evidentirane našim protokolima su neutešan plač duži od tri sata, pojava simptoma zaušaka, pojava ru bele, otok, osip i drugo.

Neželjene reakcije na vakcine su prijavljene nakon davanja DTP i MMR vakcine i nakon revakcine DT, OPV i MMR vakcinom (**Tabela 2**). Ostale obavezne vakcine nisu dale teže neželjene reakcije koje su evidentirane ovim protokolima.

MATERIALS AND METHODS

Research was carried out in the form of a cross-sectional study, through the use of data from the medical documentation of the Pediatrics Department of the Health Care Center in Indija. A record of vaccination is regularly kept at the Department for each patient. Data from special record protocols on adverse effects of vaccination were analyzed, as were the regular vaccination protocol and the vaccination reports for the period January 2009 – December 2019.

Active immunization of persons of a particular age is carried out at the Department of Pediatrics of the Health Care Center in Indija, in keeping with the Rulebook on the Program of mandatory and recommended immunization of the population against certain infectious diseases, with the exception of those persons for whom permanent contraindications have been determined. Infectious diseases against which mandatory active immunization is carried out, in persons of a particular age, are the following: tuberculosis, diphtheria, tetanus, polio, whooping cough, measles, rubella, mumps, hepatitis B, diseases caused by *Haemophilus influenzae bacterium* type B, and diseases caused by *Streptococcus pneumoniae* [6].

This research encompassed the occurrence of severe adverse reactions to vaccines, without including postvaccine elevated temperature, swelling and/or hyperemia at the injection site, irritability, etc., which are categorized as mild postvaccine reactions and occur in more than 1 in 10 children receiving the vaccine.

Data were entered and grouped in *Microsoft Word* tables, while statistical processing was performed in the form of absolute and relative frequencies.

RESULTS

Our research covered the period from January 2009 to December 2019, and during that period a total of 4,273 preschool children were vaccinated. The total number of administered vaccine doses was 70,558. The scope of vaccination in the Municipality of Indija fulfils the goals of the national immunization program, i.e., every year during this period the coverage was over 96%. **Table 1** shows the number of children vaccinated with particular vaccines and the number of administered doses per type of vaccine in the period covered.

Reported severe adverse reactions to vaccines, recorded in our protocols, were the following: inconsolable crying lasting more than three hours, the occurrence of mumps symptoms, the occurrence of rubella, swelling, rash, and other.

Adverse reactions to immunization were reported after the application of the DTP and MMR vaccines and after booster shots of DT, OPV and MMR vaccines

Tabela 1. Broj aplikovanih doza vakcina

Vakcine Vaccine	Broj dece koja su vakcinisana navedenom vakcinom (n) Number of children vaccinated with the specified vaccine (n)	Broj datih doza vakcina (n) Number of vaccine doses received (n)
BCG	4263	4263
Hep B	4269	12807
DTP	2045	8180
OPV	3892	12051
Hib	2045	8180
DtaP-IPV-Hib	2203	8812
DT	3883	3883
IPV	12	56
DT/IPV	356	356
pneumococc	860	3440
MMR	4257	8505
influenza	21	25
UKUPNO TOTAL		70558

BCG – vakcina protiv tuberkuloze; DTP – vakcina protiv difterije, tetanusa i pertusisa; OPV – oralna polio vakcina; Hib – vakcina protiv infekcija izazvanih hemofilusom influenza B; Hep B – vakcina protiv hepatitisa B; DT – vakcina protiv difterije i tetanusa; IPV – inaktivisana vakcina protiv poliomijsitisa; DT/IPV – vakcina protiv difterije, tetanusa i poliomijsitisa, inaktivisana; MMR – vakcina protiv malih boginja, rubele i zauški; DtaP-IPV-Hib – kombinovana vakcina protiv difterije, tetanusa, acelnarnog pertusisa, poliomijsitisa i infekcija izazvanih hemofilusom influenza B

Table 1. Number of administered vaccine doses

BCG – vaccine against tuberculosis; DTP – vaccine against diphtheria, tetanus and pertussis; OPV – oral polio vaccine; Hib – vaccine against infections caused by the *Haemophilus influenzae B* bacterium; Hep B – vaccine against hepatitis B; DT – vaccine against diphtheria and tetanus; IPV – inactivated vaccine against poliomyelitis; DT/IPV – vaccine against diphtheria, tetanus and poliomyelitis, inactivated; MMR – vaccine against measles, rubella and mumps; DtaP-IPV-Hib – combined vaccine against diphtheria, tetanus, acellular pertussis, poliomyelitis and infections caused by the *Haemophilus influenzae B* bacterium

DISKUSIJA

Vakcinacija predstavlja najdelotvorniju meru prevencije zaraznih bolesti. Neželjeni događaji koji mogu da se jave nakon davanja vakcine predstavljaju potencijalni rizik po zdravlje deteta. Rutinska vakcinacija mora da pruži značajnu zaštitu od zaraznih bolesti, a rizik od teških neželjenih postvakcinalnih reakcija mora biti minimalan.

Ovim istraživanjem smo uočili 13 slučajeva neželjenih reakcija na vakcinaciju za period od 11 godina, u uzorku od 4.273 dece, odnosno 70.558 datih doza vakcina, što procentualno iznosi 0,018%, tj. 18,4 na 100.000 doza (1:5.555).

Prema našem istraživanju, najveći broj dece sa neželjenom reakcijom na vakcinu je zabeležen u 2013. godini, kada su deca uzrasta 2 – 4 meseca vakcinisana prvom ili drugom dozom DTP. To je kombinovana vakcina koja se sastoji od koncentrovanog i prečišćenog toksoida difterije, koncentrovanog i prečišćenog toksoida tetanusa i mrtvih celih ćelija bakterije *Bordetella pertussis*, prouzrokovaca velikog kašlja, adsorbovanih na mineralnom nosaču (aluminijum fosfat); (Danas se koristi acelnarna vakcina protiv velikog kašlja). Prijavljena neželjena reakcija je bila neutješna plač duži od

(Table 2). Severe adverse reactions to other mandatory vaccines were not recorded in these protocols.

DISCUSSION

Vaccination represents the most effective method of preventing infectious diseases. The adverse events that may occur after vaccination administration represent a potential risk to a child's health. Routine vaccination must offer significant protection against infectious diseases, and the risk of severe postvaccine adverse reactions must be minimal.

Through this research we identified 13 cases of adverse reactions to vaccination over a period of 11 years, in a sample of 4,273 children, i.e., in 70,558 administered vaccine doses, which in percentages amounts to 0.018%, i.e., 18.4 per 100,000 doses (1:5,555).

According to our research, the greatest number of children with an adverse reaction to vaccination was recorded in 2013, when children aged 2 – 4 months were immunized with the first or second dose of DTP. This is a combined vaccine which consists of the concentrated and purified diphtheria toxoid, the concentrated and purified tetanus toxoid, and dead whole cells of the bacterium *Bordetella pertussis*, the causative agent of pertussis, adsorbed on a mineral carrier (aluminum phosphate);

Tabela 2. Neželjene reakcije nakon davanja vakcine, prema datoj vakcini

DTP				MMR				RV/BS DT OPV MMR			
D	NR	GR	pol	D	NR	G.R.	pol	D	NR	GR	pol
D	AR	YB	sex	D	AR	Y.B.	sex	D	AR	YB	sex
II	neutešan plač >3h <i>inconsolable crying >3h</i>	2013.	Ž F	I	parotitis <i>parotitis</i>	2009.	Ž F	RV/BS	generalizovana urtikarija nakon 8h <i>generalized urticaria after 8h</i>	2009.	Ž F
I	neutešan plač >3h <i>inconsolable crying >3h</i>	2013.	Ž F	I	parotitis <i>parotitis</i>	2011.	M M				
I	neutešan plač >3h <i>inconsolable crying >3h</i>	2013.	M M	I	otok kapaka posle pola sata <i>swelling of the lid after half an hour</i>	2011.	Ž F				
I	neutešan plač >3h <i>inconsolable crying >3h</i>	2013.	M M	I	parotitis <i>parotitis</i>	2013.	M M				
II	neutešan plač >3h <i>inconsolable crying >3h</i>	2013.	Ž F	I	parotitis <i>parotitis</i>	2013.	M M				
I	neutešan plač >3h <i>inconsolable crying >3h</i>	2014.	M M	I	rubela <i>rubella</i>	2016.	Ž F				

D – doza vakcine po redosledu davanja; NR – neželjena reakcija; GR – godina rođenja;
M – muški; Ž – ženski; DTP – vakcina protiv difterije, tetanusa i pertusisa;
OPV – oralna polio vakcina; MMR – vakcina protiv malih boginja, rubele i zauški;
RV – revakcina; DT – vakcina protiv difterije i tetanusa

Table 2. Adverse reactions after vaccination, according to the given vaccine

D – doses; AR – adverse reactions; YB – year of birth; F – female; M – male;
DTP – vaccine against diphtheria, tetanus and pertussis; OPV – oral polio vaccine;
MMR – vaccine against measles, rubella and mumps; BS – booster shot;
DT – vaccine against diphtheria and tetanus

tri sata (Tabela 2). Bilo je 6 slučajeva neželjenih reakcija na DTP vakcinu na 8,180 datih doza vakcine, što iznosi 73,3:100.000. Svako od te dece je dobilo preporuku od stručnog tima za utvrđivanje neželjenih događaja nakon vakcinacije da u daljem toku primaju acelularnu vakcinu protiv velikog kašlja.

Prema podacima iz literature, teži neželjeni događaji nakon primene DTP vakcine, kao što je neutešni plač koji traje duže od tri sata, javljaju se kod 1:100 vakcinisanih, dok se visoka telesna temperatura > 40,5° C i febrilne konvulzije javljaju kod 0,3 – 1% vakcinisane dece [5,7].

Od 2015. godine, u nacionalnom programu obavezne imunizacije nalazi se petovalentna vakcina koja sadrži acelularnu komponentu protiv velikog kašlja, inaktivisanu komponentu protiv dečje paralize, konjugovanu vakcinu protiv hemofilusa influence tipa b i anatoksičnu komponentu protiv difterije i tetanusa. Prema rezultatima našeg istraživanja, ova vakcina nije dala teže neželjene reakcije (Grafikon 1). Uvidom u godišnji izveštaj Instituta za javno zdravlje Vojvodine, registrovan je skoro dvostruki pad prijavljenih neželjenih reakcija na vakcinu DTP tokom 2016. i 2017. u odnosu na 2015. godinu [8].

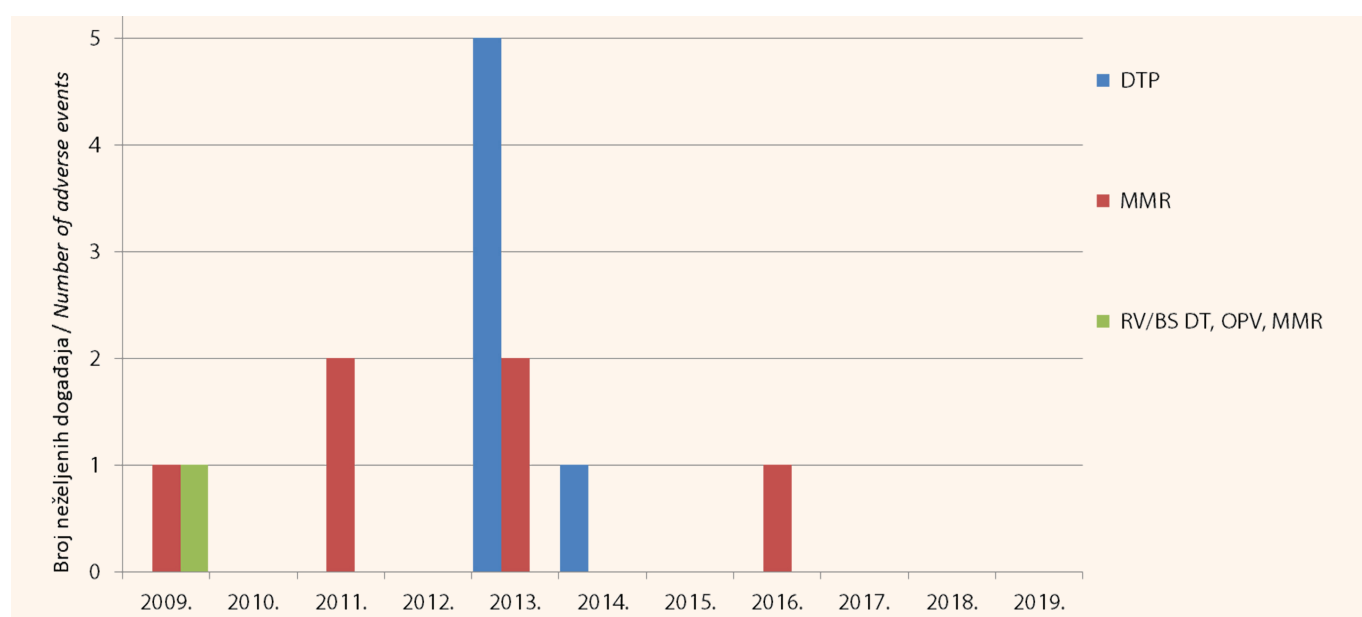
Druga grupa sa najvećim brojem neželjenih postvakcinalnih reakcija je grupa dece koja je dobijala prvu dozu žive atenuisane vakcine protiv morbila, rubele i mumpsa (Tabela 2) približno jednako u svim kalendarskim godinama u kojima smo sprovedli istraživanje. Najveći broj dece je imao kliničku sliku postvakcinalnog parotitisa, potom jedan oblik postvakcinalne

(nowadays an acellular vaccine against pertussis is administered). The reported adverse reaction was inconsolable crying lasting for more than three hours (Table 2). There were 6 cases of adverse reactions to the DTP vaccine per 8,180 administered doses of the vaccine, which amounts to 73.3:100,000. The team for determining adverse events after vaccination recommended that each one of these children should continue their immunization by receiving the acellular booster shot of the vaccine against pertussis.

According to the data from literature, severe adverse events after DTP vaccination, such as inconsolable crying lasting more than three hours, occur in 1:100 of immunized children, while elevated body temperature > 40.5° C and febrile convulsions occur in 0.3 – 1% of vaccinated children [5,7].

As of 2015, the pentavalent vaccine containing the acellular component against whooping cough, the inactivated component against polio, the conjugated vaccine against *Haemophilus influenzae* bacterium type B, and the anatoxic component against diphtheria and tetanus, is within the national program of mandatory immunization. According to the results of our research, this vaccine did not result in severe adverse reactions (Figure 1). Insight into the annual report of the Institute of Public Health of Vojvodina showed an almost twofold decrease in the number of reported adverse reactions to the DTP vaccine during 2016 and 2017 as compared to 2015 [8].

The group with the second highest number of post-vaccine adverse events was the group of children who had been receiving their first dose of the live attenuated



Grafikon 1. Grafikon pojave neželjenih događaja po godinama

DTP – vakcina protiv difterije, tetanusa i pertusisa; MMR – vakcina protiv malih boginja, rubele i zauški; OPV – oralna polio vakcina; RV – revakcina; DT – vakcina protiv difterije i tetanusa

Figure 1. Graph of occurrence of adverse events by years

DTP – vaccine against diphtheria, tetanus and pertussis; MMR – vaccine against measles, rubella and mumps; OPV – oral polio vaccine; BS – booster shot; DT – vaccine against diphtheria and tetanus

rubele i jedan slučaj akutne alergijske reakcije u roku od pola sata od primene vakcine. Uočeno je 7 slučajeva neželjenih reakcija nakon davanja 8,505 doza MMR vakcine, što daje stopu od 82,3 na 100.000 doza vakcine. Ukupna stopa postvakcinalnog parotitisa u našem istraživanju iznosi 47,0:100.000 doza vakcine, postvakcinalne rubele 11,7:100.000 doza vakcine i postvakcinalne alergijske reakcije blažeg stepena 23,5:100.000 doza vakcine, kod primene trokomponentne MMR vakcine (jedna alergijska reakcija nastala pri primeni RV MMR, OPV i DT).

Studija sprovedena u kineskoj provinciji Zejiang pokazala je da je ukupna stopa neželjenih događaja nakon davanja MMR vakcine bila 34,3 na 100.000 doza, a stopa teških neželjenih reakcija bila je 5,6 na 100.000 doza [9].

Nacionalni aktivni nadzor u Ujedinjenom Kraljevstvu utvrdio je stopu od 12 slučajeva na 100.000 doza utvrđenih nakon davanja jednokomponentne vakcine protiv morbila među decom mlađom od 16 godina [10].

Patja i saradnici u svom istraživanju otkrili su tri slučaja teže neželjene postvakcinalne reakcije koji su nastali nakon davanja MMR vakcine, što daje incidenciju od 0,1 – 0,5 na 100.000 doza vakcine za sve 3 virusne komponente zajedno [11].

Alergijske reakcije na vakcine su izuzetno retke. U našem istraživanju bilo je dva slučaja neželjene reakcije u vidu alergijske reakcije, na prvu dozu MMR i nakon RV MMR OPV DT, što iznosi 3:100.000 (1:35714). Skorašnji

vaccine against morbilli, rubella and mumps (Table 2) approximately uniformly in all the calendar years for which the research was carried out. The greatest number of children had the clinical presentation of postvaccine parotitis; there was one case of postvaccine rubella; and there was one case of acute allergic reaction within half an hour of vaccine administration. Seven cases of adverse reactions after the administration of 8,505 doses of the MMR vaccine were noted, which was a rate of 82.3 per 100,000 doses of the vaccine. The total rate of postvaccine parotitis in our study was 47.0:100,000 doses of the vaccine; the total rate of postvaccine rubella was 11.7:100,000 doses of the vaccine; and the total rate of postvaccine mild allergic reaction was 23.5:100,000 doses of the vaccine, in the application of the trivalent MMR vaccine (one allergic reaction occurred in the application of the RV MMR, OPV and DT vaccines).

A study carried out in the Zhejiang Chinese province showed that the total rate of adverse events upon MMR vaccine administration was 34.3 per 100,000 doses, and the rate of severe adverse reactions was 5.6 per 100,000 doses [9].

National active monitoring in the United Kingdom determined a rate of 12 cases per 100,000 doses noted after the administration of a single-component vaccine against morbilli amongst children under 16 years old [10].

In their study, Patja et al. discovered three cases of severe adverse postvaccine reactions occurring after MMR vaccine administration, which was equal to an incidence of 0.1 – 0.5 per 100,000 vaccine doses for all of the three viral components together [11].

izveštaji Svetske alergološke organizacije daju podatak o procenjenoj stopi alergijskih reakcija od 1:50.000 do 1:1.000.000 i anafilaksije od 1:100.000 do 1:1.000.000 datih doza vakcine [12]. Anafilaksija nakon imunizacije je veoma retka i noviji izveštaji Sua i saradnika daju podatak stope od 1,3 slučaja na 1 milion primljenih doza u SAD-u [13].

U našem istraživanju nismo uočili polnu predominaciju za pojavu neželjenih reakcija na vakcinu (Tabela 2). U analizama Mek Nila i saradnika uočena je prevaga muškog pola kod mlađih od 19 godina i ženskog pola kod starijih od 19 godina [14].

ZAKLJUČAK

Neželjene reakcije nakon vakcinacije, uključujući i alergijske reakcije, veoma su retke. Obzirom da postoje postvakcinalne reakcije široke kliničke prezentacije veoma je važno izdiferencirati prave teške postvakcinalne reakcije. Kod pojave neželjenih reakcija, uključujući i alergijske reakcije na vakcinu, potrebna je klinička i alergološka obrada kako se ne bi odlagala ili prekinula redovna vakcinacija. Ovo istraživanje, kao i mnoga druga istraživanja na ovu temu, potvrđuje veoma retku pojavu teže neželjene reakcije na vakcinaciju. Rizici od neželjenih reakcija od imunizacije su daleko manji u odnosu na koristi dobijene što obuhvatnijom vakcinacijom, kako pojedinca tako i celog kolektiva.

SKRAĆENICE

BCG – vakcina protiv tuberkuloze
DTP – vakcina protiv difterije, tetanusa i pertusisa
OPV – oralna polio vakcina
Hib – vakcina protiv infekcija izazvanih hemofilusom influenzae B
Hep B – vakcina protiv hepatitisa B
RV – revakcina
DT – vakcina protiv difterije i tetanusa
IPV – inaktivisana vakcina protiv poliomijelitisa
DT/IPV – vakcina protiv difterije, tetanusa i poliomijelitisa, inaktivisana
MMR – vakcina protiv malih boginja, rubele i zauški
DtaP-IPV-Hib – kombinovana vakcina protiv difterije, tetanusa, acelularnog pertusisa, poliomijelitisa i infekcija izazvanih hemofilusom influenzae B

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Allergic reactions to vaccines are extremely rare. In our study there were two cases of adverse reactions, in the form of allergic reactions, to the first dose of the MMR vaccine and after the administration of the RV MMR OPV DT, which was 3:100,000 (1:35,714). A recent report by the World Allergy Organization provided the data on the estimated rate of allergic reactions of 1:50,000 to 1:1,000,000 and of anaphylaxis of 1:100,000 to 1:1,000,000 administered vaccine doses [12]. Anaphylaxis upon immunization is very rare and a recent study by Su et al. reported a rate of 1.3 cases per 1 million received doses in USA [13].

In our study we did not detect a sex related predominance in the occurrence of adverse reactions to vaccination (Table 2). In the analyses of McNeil et al. a predominance of the male sex was noted in those aged under 19 years and of the female sex in those aged over 19 years [14].

CONCLUSION

Adverse reactions upon vaccination, including allergic reactions, are very rare. Bearing in mind that there are postvaccine reactions of broad clinical presentation, it is very important to differentiate actual severe postvaccine reactions. In the occurrence of adverse reactions, including allergic reactions to a vaccine, clinical and allergological processing is necessary so as to prevent any delay or interruption in regular immunization. This study, just like many other studies related to this topic, confirm the very rare occurrence of severe adverse reactions to vaccination. Risks of adverse reactions to immunization are far lesser as compared to the benefits of comprehensive vaccination, both of an individual and of the entire community.

ACRONYMS AND ABBREVIATIONS

BCG – vaccine against tuberculosis
DTP – vaccine against diphtheria, tetanus and pertussis
OPV – oral polio vaccine
Hib – vaccine against infections caused by the Haemophilus influenzae B bacterium
Hep B – vaccine against hepatitis B
BS – booster shot
DT – vaccine against diphtheria and tetanus
IPV – inactivated vaccine against poliomyelitis
DT/IPV – vaccine against diphtheria, tetanus and poliomyelitis, inactivated
MMR – vaccine against measles, rubella and mumps
DtaP-IPV-Hib – combined vaccine against diphtheria, tetanus, acellular pertussis, poliomyelitis and infections caused by the Haemophilus influenzae B bacterium

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