ORIGINAL SCIENTIFIC PAPER (IZVORNI ZNANSTVENI RAD)

Availability of magnetic resonance imaging during the COVID-19 pandemic at the Children's disease clinic in Zagreb

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DOI: https://doi.org/10.55378/rv.49.1.1

Abstract

The study analyzed the impact of the COVID-19 pandemic on the availability of MRI services for pediatric patients in five diagnostic groups according to ICD-10 that were most prevalent in the pediatric diagnostics of the Children's Disease Clinic in Zagreb from January 1, 2018, to December 31, 2021.

There were no statistically significant differences regarding the age of patients ordered for MRI scans in the most frequent diagnostic groups between the pre-pandemic years (2018, 2019) and the pandemic years (2020, 2021) at the clinic's outpatient and inpatient departments. Likewise, no statistically significant differences were found in the average waiting time, which was 17 weeks, for patients referred for MRIs in the pre-pandemic (2018, 2019) and pandemic (2020, 2021) years.

The negative trend of decreasing the number of scans can be linked to longer intervals between individual scans, as a result of the applicable epidemiological guidelines, as well as concerns from parents about infection, who voluntarily postponed elective check-ups, as well as due to their own or their child's positive PCR test for coronavirus.

In the case of an increase in the number of scans, it can be attributed to a higher number of patients referred from other institutions for MRI scans, especially oncology patients.

Keywords: children; quality; MRI; pandemic; imaging

Introduction

The COVID-19 pandemic in the 21st century led to numerous changes and phenomena such as isolation and self-isolation, high numbers of daily deaths, the conversion of departments and entire hospitals into COVID departments, and then COVID hospitals, as well as the redistribution of healthcare workers to work in COVID wards. Patient associations and the Ombudsperson for Children warned in the media about the inaccessibility of certain healthcare services during the pandemic (1).

At the Children's Disease Clinic 'Klaićeva', almost all Magnetic Resonance Imaging (MRI) diagnostics for children in Croatia are performed, especially for children who require general anesthesia (GA). At the beginning of the pandemic and with the introduction of epidemiological measures, there were demanding changes for healthcare workers at the Radiology Department and the need for various adjustments to the new situation, including shifting the time between individual scans of young patients, ventilating the space between scans, and increased disinfection of the space.

MRI is not considered a dangerous or harmful examination for health (2,3). The procedure typically lasts from 20 to 60 minutes. The main advantages of MRI are the better contrast representation of soft tissues (water, fat, muscles, and other soft tissues are more distinctly differentiated compared to CT scans). It is especially an important method for diagnosing diseases of the central nervous system (brain and spinal cord), pelvic organs, joints, and soft tissues. MRI images provide important information to doctors in diagnosing various diseases and conditions (4). Due to the absence of radiation risk, this method can be repeated if there is dissatisfaction with the image quality or if the child is restless, multiple times, without harmful effects on the child's health. What can objectively cause discomfort and fear in a child are the noise of the device and the stay inside the machine's tun-

nel. Therefore, the child's companion must be a parent or guardian (5).

Quality indicators in the healthcare system not only describe the level of performance in standards but also provide a fundamental dimension to healthcare that relates to: efficiency, accessibility, safety, effectiveness, justification, patient-centeredness, timeliness, appropriateness, quality improvement, and others, with efficiency and effectiveness being key in every definition of healthcare quality.

In line with the above, the Children's Disease Clinic 'Klaićeva' continuously strives to ensure the availability of MRI services by systematically improving accessibility to MRI exams through reducing official waiting lists for MRI diagnostics and maximizing the use of available MRI equipment. Parents of pediatric patients are promptly reminded of their scheduled appointments, and confirmation of attendance is requested, so that in case the patient cannot attend the planned examination on time, another patient can be called instead.

Furthermore, the patient is prepared for the examination with additional instructions on which recent results should be presented during the exam (e.g., kidney function parameters), and the parent is reminded of which medical documentation needs to be presented during the examination. Special attention is given to the successful completion of the exam, applying all current norms and standards to avoid the need for repeating the examination, as well as to ensure that the duration of the exam is time-adjusted for young patients. The most important criterion that must be considered is the care for the health of pediatric patients, which must be a top priority in order to ensure that the quality of healthcare is at the highest level.

During the COVID-19 pandemic, wearing protective masks and other protective equipment contributed to an even greater increase in anxiety among 'young' patients, and at the Children's Disease Clinic 'Klaićeva,' a solution to this problem was found.

Instead of a large, gray, intimidating device that even adults can be afraid of, let alone children, the MRI diagnostic room was transformed into a pleasant yellow submarine environment, with elements of dolphins, fish, and an octopus on the walls. Thanks to this intervention in the space, healthcare workers daily witness the joy of children, who no longer perceive the MRI exam as something unpleasant but as a place where they will sail in a submarine among colorful fish. As a result, the stress level in children has been reduced to the minimum possible level.

Aim of the paper

The aim of this paper was to investigate the availability of MRI services for children during the COVID-19 pandemic in relation to the diagnosis of patients.

Methods

This is a retrospective study – conducted at the Children's Disease Clinic Zagreb, within the Department of Pediatric Radiology, MRI diagnostic unit, for a four-year period from January 1, 2018, to December 31, 2021.

The study focuses on the difference in the availability of the diagnostic procedure conducted for patients referred for MRI exams in the pre-pandemic years (from January 1, 2018, to December 31, 2019) and the years of the COVID-19 pandemic (from January 1, 2020, to December 31, 2021), in relation to the patients' diagnoses in the MRI diagnostic unit.

Prior to the study, we received approval from the Ethics Committee of the Children's Disease Clinic Zagreb during an electronic meeting, which decided that there were no ethical objections to conducting this research, and the director's consent for conducting the study was obtained.

The Hospital Information System (HIS) in its functional division recognizes the availability of data in the outpatient clinic (processing patients coming from external institutions and those referred by pediatricians from primary healthcare) and inpatient (patients receiving hospital treatment) (6).

The main input data, or the source of data for this study, was the HIS of the Children's Disease Clinic Zagreb. Data was collected on the total number of days on the

Figure 1. MRI machine at the Zagreb Clinic for Children's Diseases Source: Children's Disease Clinic Zagreb

official waiting list for MRI scans and the total number of patients on the official waiting list for MRI scans from January 1, 2018, to December 31, 2021.

Further review of the database –HIS, for patients who underwent MRI exams, recorded the following data: diagnostic (DG) groups, age, general anesthesia (GA), outpatient clinic, inpatient.

The diagnostic groups according to the International Classification of Diseases (ICD-10) that were singled out and covered by this study were selected based on the most frequent number of performed MRI exams.

Based on the data obtained on the examination date and the date of referral for the examination, the waiting time for the MRI exam at the diagnostic unit was calculated. The standard set by the Agency for Quality and Accreditation in Health and Social Care regarding waiting times for MRI procedures for urgent conditions is up to 24 hours, and for exams that are scheduled in advance, up to 18 weeks (7).

Results

The most frequent diagnostic groups according to the ICD-10 classification in this study are:

- DG group 1: C00 – D48 – Neoplasms
- DG group 2: G00 – G99 – Diseases of the Nervous System
- DG group 3: M00 – M99 – Diseases of the Musculoskeletal System and Connective Tissue
- DG group 4: Q00 – Q99 – Congenital Malformations, Deformations, and Chromosomal Abnormalities
- DG group 5: R00 – R99 – Symptoms, Signs, and Abnormal Clinical and Laboratory Findings, Not Elsewhere Classified
- DG group 6: Other ICD-10 diagnostic groups (6).

Table 1. Proportion of patients referred for diagnostic groups scanned by MRI in the outpatient clinic and inpatient setting during pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

	2018.		2019.		2020.		2021.	
Proportion (%)	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments
Dg. group 1: C00 – D48	9,5	26,3	10,1	27,4	13,7	26,1	11,7	25,6
Dg. group 2: G00 – G99	21	14,5	16,6	17,4	16,8	22,3	16,2	23,7
Dg. group 3: M00 – M99	23,5	4,3	22,9	4,1	20,7	5,3	20,8	3
Dg. group 4: Q00 – Q99	7,4	9	7,5	5	7,7	3,4	6,9	3
Dg. group 5: R00 – R99	16,4	9,8	17,5	13,8	17	10,2	17,9	15,8
Dg. group 6: other dg. group MKB-10	21,8	35,7	25	32,1	23,9	32,5	26,2	28,6

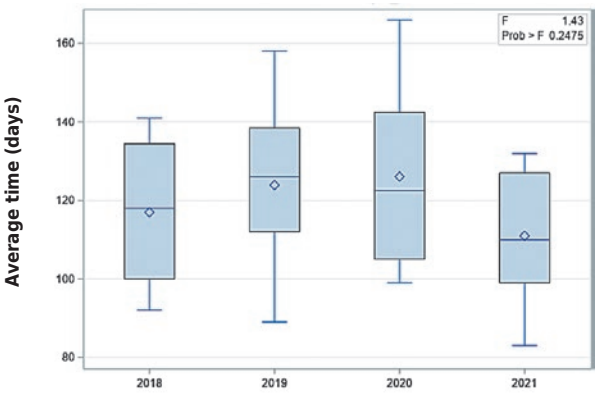
Table 2. Proportion of patients referred for diagnostic groups under GA scanned by MRI in the outpatient clinic and inpatient departments during pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

	2018.		2019.		2020.		2021.	
Proportion (%)	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments	Outpatient clinic	Inpatient departments
Dg. group 1: C00 – D48	9,9	25,8	9,8	26,3	12,4	29,4	10,7	26,8
Dg. group 2: G00 – G99	22,3	16,4	16,3	16,7	20,4	18,5	17,2	23,9
Dg. group 3: M00 – M99	6,3	1,9	7	3,5	7,6	4,4	7,4	1,4
Dg. group 4: Q00 – Q99	15,5	13,4	14	9,5	12,4	5,1	11,4	5
Dg. group 5: R00 – R99	20,3	5,4	23	10,1	20,1	8,3	23,8	13
Dg. group 6: other dg. group MKB-10	25,4	36,8	29,5	33,5	26,8	33,9	29,2	29,7

Table 3. Average age (years) of patients referred for diagnostic groups scanned by MRI in the outpatient clinic and inpatient departments during pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

	2018.		2019.		2020.		2021.	
Udio (%)	**Outpatient clinic**	**Inpatient departments**	**Outpatient clinic**	**Inpatient departments**	**Outpatient clinic**	**Inpatient departments**	**Outpatient clinic**	**Inpatient departments**
Dg. group 1: C00 – D48	12	7,4	12,5	7,2	12,7	6,4	12,2	7,6
Dg. group 2: G00 – G99	11,7	5,9	11,7	8,4	11,6	7,2	11,7	7,9
Dg. group 3: M00 – M99	13,6	11,2	13,4	9,3	14	7,9	13,4	10,2
Dg. group 4: Q00 – Q99	9,8	2,3	10,1	2,3	10,8	2,6	9,8	3,1
Dg. group 5: R00 – R99	11	9,3	11,4	8,9	11,6	8,6	11,1	7,8
Dg. group 6: other dg. group MKB-10	11,7	6,4	11,7	6,7	11,7	6	11,2	6,8

Chart 1. Box plot of the average waiting time for all referred patients scanned by MRI between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).



Pre-pandemic (2018, 2019) and pandemic (2020, 2021) years

The shown chart 1. shows no statistically significant differences in the average waiting time for all referred patients from diagnostic groups scanned by MRI between the pre-pandemic and pandemic years.

In the shown chart 2. the proportion of referred patients for diagnostic group 1 (C00 – D48) – neoplasms, scanned in the outpatient clinic during the pre-pandemic year of 2018 (9.5 ± 0.6 %) was 34% lower (p = 0.0001) than in 2020 (13.7 ± 0.8 %) and 21% lower (p = 0.02) than in 2021 (11.7 ± 0.7 %). Similarly, the proportion of referred patients in the pre-pandemic year of 2019 (10.1 ± 0.7 %) was 30% lower (p = 0.001) than in 2020 (13.7 ± 0.8 %).

In the shown chart 3. the proportion of referred patients for diagnostic group 2 (G00 – G99) – diseases of the nervous system, scanned in the outpatient clinic during the pre-pandemic year of 2018 (21 ± 0.9 %) was 1.31 times higher (p = 0.001) than in 2020 (16.8 ± 0.9

Chart 2. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 1 (C00 – D48) scanned by MRI in the outpatient clinic between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

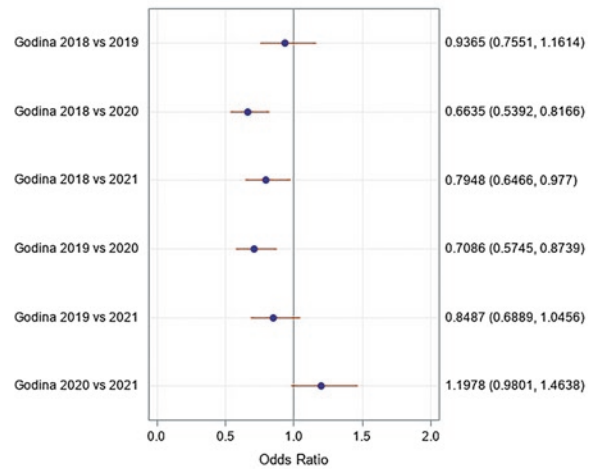


Chart 3. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 2 (G00 – G99) scanned by MRI in the outpatient clinic between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

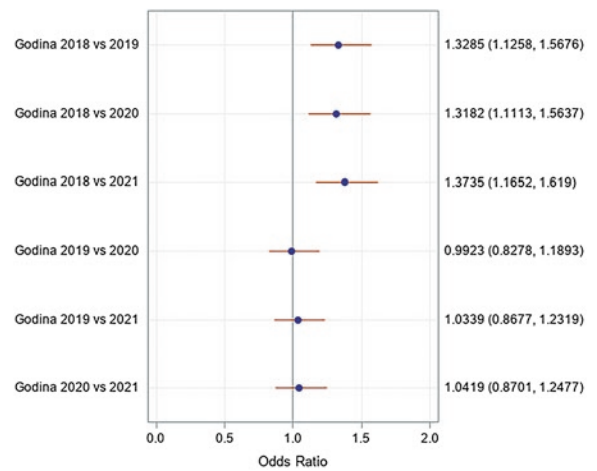


Chart 4. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 3 (M00 – M99) scanned by MRI in the outpatient clinic between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

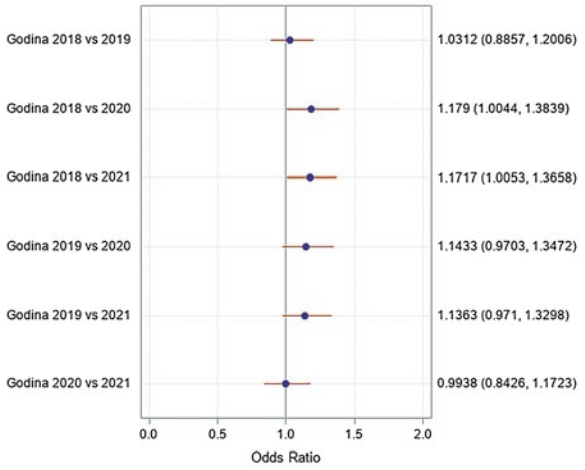
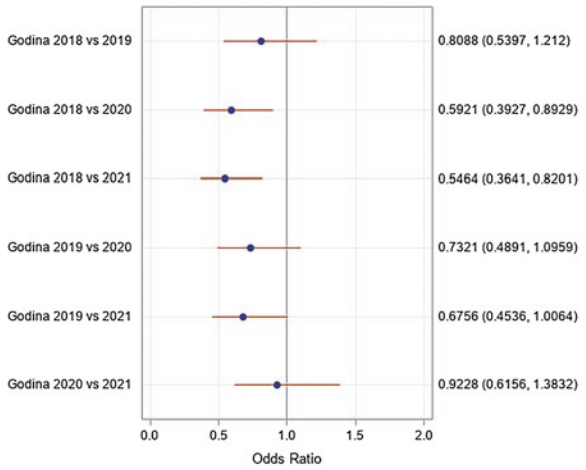


Chart 6. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 2 (G00 – G99) scanned by MRI in the inpatient department between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).



%) and 1.37 times higher (p = 0.0002) than in 2021 (16.2 ± 0.8 %). Additionally, a statistically significant difference was observed in the proportion of referred patients (p = 0.0008) between the pre-pandemic years, where in 2018 (21 ± 0.9 %) there were 1.32 times more patients compared to 2019 (16.6 ± 0.8 %).

In the shown chart 4. the proportion of referred patients for diagnostic group 3 (M00 – M99) – diseases of the musculoskeletal system and connective tissue, scanned in the outpatient clinic during the pre-pandemic year of 2018 (23.5 ± 0.9 %) was 1.17 times higher (p = 0.04) than in 2020 (20.7 ± 1 %) and 1.17 times higher (p = 0.04) than in 2021 (20.8 ± 0.9 %).

In the shown chart 5. the proportion of referred patients for diagnostic group 6 – other diagnostic groups (ICD-10), scanned in the outpatient clinic during the pre-pandemic year of 2018 (21.9 ± 0.9 %) was 22% lower (p = 0.001) than in 2021 (26.2 ± 1 %). Additionally, a statistically significant difference was observed in the proportion of referred patients (p = 0.02) between the pre-pandemic years, where in 2018 (21.9 ± 0.9 %) there were 16% fewer patients compared to 2019 (25 ± 1 %).

In the shown chart 6. the proportion of referred patients for diagnostic group 2 (G00 – G99) – diseases of the nervous system, scanned in the inpatient department during the pre-pandemic year of 2018 (14.5 ± 1.8 %) was 41% lower (p = 0.01) than in 2020 (22.3 ± 2.5 %) and 46% lower (p = 0.003) than in 2021 (23.7 ± 2.6 %).

In the shown chart 7. the proportion of referred patients for diagnostic group 4 (Q00 – Q99) – congenital mal-

Chart 5. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 6 – other diagnostic groups (ICD-10) scanned by MRI in the outpatient clinic between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

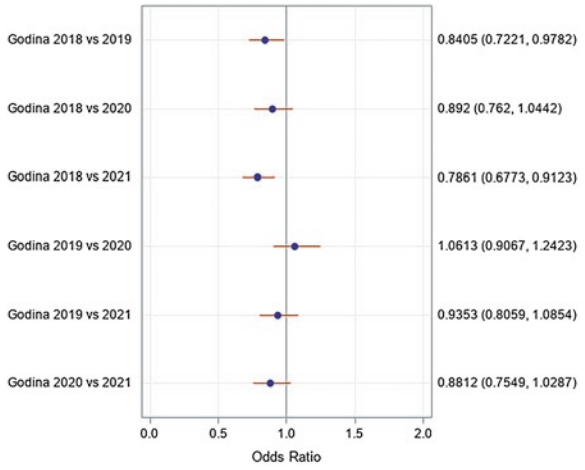


Chart 7. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 4 (Q00 – Q99) scanned by MRI in the inpatient department between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).

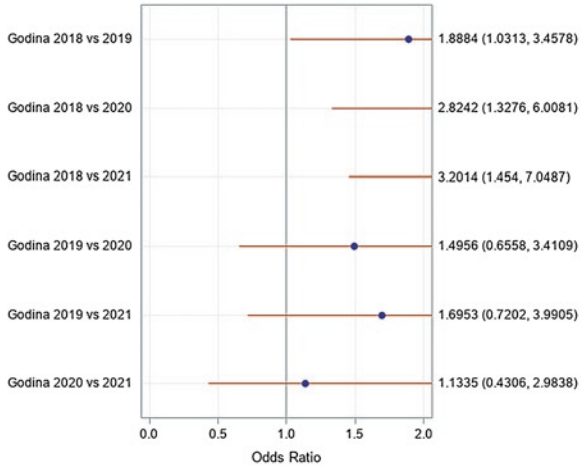
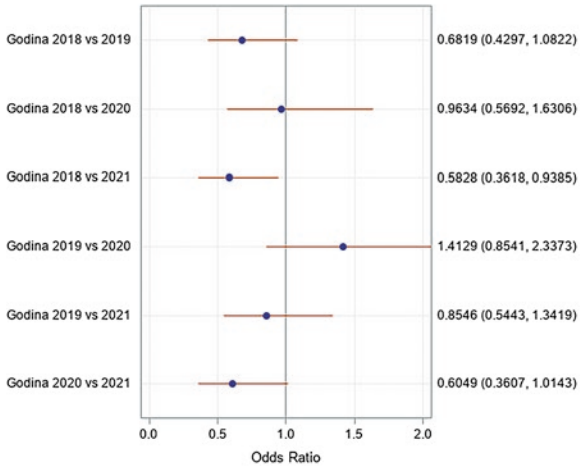


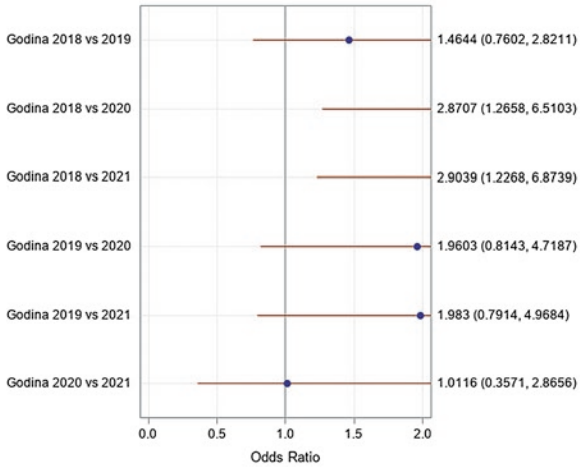
Chart 8. Graphical representation of the odds ratio and 95% confidence interval for the number of referred patients for diagnostic group 5 (R00 – R99) scanned by MRI in the inpatient department between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).



formations, deformities, and chromosomal abnormalities, scanned in the inpatient department during the pre-pandemic year of 2018 (9 ± 1.5 %) was 2.82 times higher (p = 0.007) than in 2020 (3.4 ± 1.1 %) and 3.2 times higher (p = 0.003) than in 2021 (3 ± 1 %). Additionally, a statistically significant difference was observed in the proportion of referred patients (p = 0.03) between the pre-pandemic years, where in 2018 (9 ± 1.5 %) there were 1.88 times more patients compared to 2019 (5 ± 1.1 %).

In the shown chart 8. the proportion of referred patients for diagnostic group 5 (R00 – R99) – symptoms, signs, and abnormalities of clinical and laboratory findings not classified elsewhere, scanned in the inpatient department during the pre-pandemic year of 2018 (9.8 ± 1.5 %) was 42% lower (p = 0.02) than in 2021 (15.8 ± 2.2 %).

Chart 9. Graphical representation of the odds ratio and 95% confidence interval of the number of patients referred for diagnostic group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities, scanned under GA in the inpatient department, using MRI between pre-pandemic and pandemic years (Klaićeva Hospital, Zagreb, Croatia).



On the shown graph 9. the proportion of referred patients for diagnostic group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities, scanned under GA in the inpatient department in the pre-pandemic year of 2018 (13.4 ± 2.4%) was 2.87 times higher (p = 0.01) compared to the year 2020 (5.1 ± 1.7%) and 2.9 times higher (p = 0.01) compared to the year 2021 (5.0 ± 1.8%).

Discussion

The study analyzed archival data collected from the HIS during regular clinical work at the Clinic for Children's Diseases in Zagreb. The impact of the COVID-19 pandemic on the availability of MRI services for pediatric patients was analyzed according to the ICD-10 classification. For the so-called pre-pandemic years, data from 2018 and 2019 were used, while for the so-called pandemic years, data from 2020 and 2021 were used.

Like any other method, MRI scanning also has its drawbacks, such as the duration of the procedure, the cost of the exam, and the confined space of the MRI machine where the child is alone during the scan, which can trigger claustrophobia in children. The main disadvantage of the MRI machine for children is the long duration of the procedure (on average from 20 to 60 minutes), which is especially problematic for very young children, for whom sedation and GA are often required (9). The process is particularly challenging for children with neurodevelopmental disorders, where facing new task demands in an unfamiliar environment can be more difficult due to symptoms-related difficulties.

In 2020, the COVID-19 pandemic emerged, significantly altering the lives of individuals in all aspects of personal, social, work, and life functioning. During the first months of the pandemic, before the advent of an effective vaccine, healthcare professionals faced an especially large challenge in providing care under the new conditions (10). In the world, and also in Croatia, public campaigns urged people to 'stay at home' and avoid unnecessary gatherings and visits to healthcare facilities. In addition to periods of full or partial quarantine, the fear of infection in healthcare facilities discouraged patients from seeking medical services. This resulted in delays in various diagnostic and therapeutic procedures that could be considered less urgent, such as MRI scans for certain indications, either by the healthcare system or by the patients themselves. In some countries, a decrease in the number of MRI procedures was recorded, although to this day, national studies have not been reported (11).

This study found no statistically significant differences in the age of the patients referred for MRI scans in the most common diagnostic groups between the pre-pandemic and pandemic years, either for those scanned in the outpatient clinic or in the hospital at the Clinic for Children's Diseases in Zagreb. Likewise, no statistically significant differences were found in the average waiting time for patients referred for MRI scans between the pre-pandemic and pandemic years.

The proportion of patients referred for MRI scans under GA did not show statistically significant differences between the pre-pandemic and pandemic years for most diagnostic groups. The only exception was for diagnostic

group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities, where the proportion of patients referred for MRI under GA in the hospital was 2.87 times higher in 2018 compared to 2020 and 2.9 times higher compared to 2021.

Furthermore, it can be determined that for some diagnostic groups, such as diagnostic group 2 (G00 – G99) – diseases of the nervous system, the number of patients referred for MRI scans under GA in the outpatient clinic was higher in the pre-pandemic 2018 compared to 2019. Interestingly, the proportion of referred patients in the pre-pandemic 2018 was 62% lower than in 2021 when considering diagnostic group 5 (R00 – R99) – symptoms, signs, and abnormal findings in clinical and laboratory tests not classified elsewhere, scanned under GA in the hospital.

The total number of patients referred for MRI scans in the outpatient clinic for diagnostic group 1 (C00 – D48) – neoplasms and diagnostic group 6 – other diagnostic groups in the ICD-10 was lower in the pre-pandemic compared to the pandemic years. The proportion of referred patients for diagnostic group 2 (G00 – G99) – diseases of the nervous system and diagnostic group 3 (M00 – M99) – diseases of the musculoskeletal system and connective tissue was higher in the pre-pandemic compared to the pandemic years.

The proportion of patients referred for MRI scans in the hospital for diagnostic group 2 (G00 – G99) – diseases of the nervous system was lower in the pre-pandemic compared to the pandemic years, while the proportion of patients referred for MRI scans in the hospital for diagnostic group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities was higher in the pre-pandemic compared to the pandemic years.

The negative trend of decreasing the number of scans can be associated with longer intervals between individual scans as a result of the applicable epidemiological guidelines and parental fears of infection, leading them to voluntarily delay elective check-ups, as well as due to their own or their child's PCR test being positive for COVID-19. In the case of an increase in the number of scans, it could be attributed to the referral of more patients from other institutions for MRI scans, particularly oncological patients.

Conclusion

For diagnostic group 1 (C00 – D48) – neoplasms and diagnostic group 6 – other ICD-10 diagnostic groups in the outpatient clinic, a higher number of scans was observed in the pandemic years compared to the pre-pandemic years, while for diagnostic group 2 (G00 – G99) – diseases of the nervous system and diagnostic group 3 (M00 – M99) – diseases of the musculoskeletal system and connective tissue, a lower number of scans was observed in the pandemic years compared to the pre-pandemic years.

For diagnostic group 2 (G00 – G99) – diseases of the nervous system in the hospital, a higher number of scans was observed in the pandemic years compared to the pre-pandemic years, while for diagnostic group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities, a lower number of scans was observed in the pandemic years compared to the pre-pandemic years.

The number of patients scanned under GA in the pre-pandemic year of 2018 was higher than in the pandemic years for diagnostic group 4 (Q00 – Q99) – congenital malformations, deformities, and chromosomal abnormalities.

The increase in the number of scans can be associated with the referral of a greater number of patients from other institutions for MRI scans, especially oncological patients.

The reduction in the number of some scans can be linked to longer intervals between individual scans as a result of the applicable epidemiological guidelines and the absence of patients due to their parents voluntarily postponing elective check-ups, as well as due to their own or their child's PCR test being positive for COVID-19.

Despite the pandemic and changes in the hospital system due to lockdowns, the average waiting time for diagnostic imaging performed by MRI at the Children's Hospital Zagreb did not increase, remaining at 17 weeks in both the pre-pandemic and pandemic years.

All data in this paper are part of the results of master's thesis „Difference in availability of magnetic resonance imaging diagnostic procedure during the COVID-19 pandemic in relation to patient diagnosis at the Clinic for children's diseases Zagreb" written at the University Department of Health Studies, University of Split (12).

References

1. Republic of Croatia, Ombudsman for Children. Children Waiting – Children's Rights During the Pandemic [Internet]. Zagreb: 2022. Available at: https://dijete.hr/docs/djeca%20na%20cekanju-djecja%20prava%20u%20vrijeme%20pandemije%202020.-2021_prilog%20izvjescu%20pravobraniteljice%20za%20djecu.pdf
2. Frankel J, Wilén J, Hansson Mild K. Assessing Exposures to Magnetic Resonance Imaging's Complex Mixture of Magnetic Fields for In Vivo, In Vitro, and Epidemiologic Studies of Health Effects for Staff and Patients. Front Public Health. 2018 Mar 12;6:66. doi: 10.3389/fpubh.2018.00066.
3. Regulation on Protection from Electromagnetic Fields, Narodne novine, NN 146/2014. [Internet]. Available at: https://narodne-novine.nn.hr/clanci/sluzbeni/2014_12_146_2740.html
4. U.S. Food and Drug Administration. Benefits and Risks [Internet]. Silver Spring: FDA; 2017. Available at: https://www.fda.gov/radiation-emitting-products/mri-magnetic-resonance-imaging/benefits-and-risks
5. Patient Rights Protection Act, Narodne novine, 169/2004. [Internet]. Available at: https://narodne-novine.nn.hr/clanci/sluzbeni/2004_12_169_2953.html
6. Poje I, Braović M. Hospital Information System – Advantages and Disadvantages in Operation [Internet]. Zagreb: Croatian Medical Informatics Society; 2019. Available at: https://hrcak.srce.hr/file/324767
7. Mittermayer R, editor. Handbook on Healthcare Quality Standards and Their Application [Internet].Zagreb:Agency for Quality and Accreditation in Healthcare; 2011. Available at: http://www.aaz.hr/sites/default/files/prirucnik_o_standardima_kvalitete_zdravstvene_zastite_i_nacinu_njihove_primjene_0.pdf
8. Croatian Institute of Public Health. International Classification of Diseases and Related Health Problems – ICD-10. Tenth Revision; Volume 1, 2nd edition [Internet]. Zagreb: Medicinska naklada; 2012. Available at: https://apps.who.int/iris/bitstream/handle/10665/44081/9789241547666_hrv.pdf
9. Edelstein WA, Mahesh M, Carrino JA. MRI: time is dose--and money and versatility. J Am Coll Radiol. 2010 Aug;7(8):650-2. doi: 10.1016/j.jacr.2010.05.002.

10. Rosenbaum L. The Untold Toll – The Pandemic's Effects on Patients without Covid-19. N Engl J Med. 2020 Jun 11;382(24):2368-2371. doi: 10.1056/NEJMms2009984.
11. Luxenburg O, Saban M, Myers V, Vaknin S, Boldor N, Wilf-Miron R. National and regional trends in MRI utilization in the face of the ongoing COVID-19 pandemic. Isr J Health Policy Res. 2021 Jul 15;10(1):40. doi: 10.1186/s13584-021-00
12. Folnožić J. Razlika u dostupnosti dijagnostičkog postupka magnetskom rezonancijom u vrijeme pandemije COVID -19 u odnosu na dijagnozu pacijenata u Klinici za dječje bolesti Zagreb (Diplomski rad). Split: Sveučilište u Splitu, Sveučilišni odjel zdravstvenih studija; 2022 (pristupljeno 10.11.2024.) Available at: https://urn.nsk.hr/urn:nbn:hr:176:668972

Dostupnost magnetske rezonancije tijekom pandemije COVID-19 u Klinici za dječje bolesti Zagreb

Sažetak:

U istraživanju je analiziran utjecaj pandemije bolesti COVID-19 na dostupnost usluge MR-a dječjim pacijentima na pet dijagnostičkih skupina po MKB-10 koje su bile najzastupljenije u pedijatrijskoj dijagnostici Klinike za dječje bolesti Zagreb u razdoblju od 1. siječnja 2018. godine do 31. prosinca 2021. godine.

Statistički značajnih razlika nije bilo prema dobi naručenih pacijenata najčešćih dijagnostičkih skupina snimljenih MR-om u poliklinici i u stacionaru Klinike za dječje bolesti Zagreb između pretpandemijskih (2018., 2019.) i pandemijskih (2020., 2021.) godina. Jednako tako nije bilo statistički značajnih razlika u prosječnom vremenu čekanja, koje iznosi 17 tjedana, u naručenih pacijenata snimljenih MR-om u pretpandemijskim (2018., 2019.) i pandemijskim (2020., 2021.) godinama.

Negativan trend smanjenja broja snimanja može se povezati s većim vremenskim razmacima između pojedinačnih snimanja, kao rezultat važećih epidemioloških smjernica te s bojazni roditelja pacijenata zbog zaraze, koji su samoinicijativno odgađali elektivne kontrole, no i zbog vlastita ili djetetova PCR testa pozitivnog na koronavirus.

U slučaju povećanja broja snimanja možemo govoriti o upućivanju većega broja pacijenata iz drugih ustanova na MR snimanja, posebno onkoloških pacijenata.

Ključne riječi: djeca; kvaliteta; MR; pandemija; snimanje