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Correlation Between Age and Tonsil Size in Patients with Chronic Tonsillitis at Aek Kanopan District General Hospital, North Sumatra

Heri Bastian Hutasoit
Faculty of Medicine, University of North Sumatra, Medan, Indonesia

Abstract: Background: Chronic tonsillitis is inflammation of the tonsils that persists as a result of repeated acute or subclinical infections. The size of the tonsils in chronic tonsillitis is enlarged due to parenchymal hyperplasia or fibrinoid degeneration with obstruction of the tonsillar crypts. Based on data from the Indonesian Ministry of Health in 2012, the incidence of tonsillitis in Indonesia is around 23%. Young age predominates in the characteristics of tonsillitis patients.
Objective: The research was to determine the correlation between age and tonsil size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra.
Method: This study uses secondary data, namely medical records at Aek Kanopan Hospital, North Sumatra. Research and data collection were carried out in November 2022 - February 2023. This research is an analytical study. The population is chronic tonsillitis patients at the ENT-KL installation at Aek Kanopan Hospital, North Sumatra, totaling 70 patients. Data analysis was univariate presented in the form of a frequency distribution table and bivariate analysis using a correlation testspearman rho by using SPSS version 24.0.
Results: Based on the study, as many as (57.6%) were women and (42.4%) were men, most were aged <18 years, namely (72.7%), mostly with hypertrophic tonsil sizes, namely (65.2%) and there were Correlation between age and tonsillitis size in chronic tonsillitis at Aek Kanopan District General Hospital, North Sumatra, p=0.000 (p<0.05).
Conclusion: There is a correlation between age and tonsillitis size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra.
Keywords: Gender, Age, Tonsil Size

I. INTRODUCTION

Chronic tonsillitis is the most common of all recurrent throat ailments. Chronic tonsillitis generally occurs due to complications of acute tonsillitis, especially those that do not receive adequate therapy. Apart from inadequate treatment, other predisposing factors for chronic tonsillitis are poor oral hygiene, physical fatigue and certain types of food.[1-3]

Common symptoms of chronic tonsillitis are sore throat, dysphagia and fever. Diseases of the tonsils affect other anatomically related structures such as the middle ear canal, paranasal sinuses, and the junction of the upper respiratory tract with the digestive tract. Children who have chronic tonsillitis have enlarged tonsils and enlarged blood vessels on the surface of the tonsils.[4]Inflammation of the tonsils will result in enlargement which causes difficulty swallowing or feels like there is a lump in the throat. In children, usually this condition can also result in complaints in the form of snoring during sleep because the influence of the size of the tonsils interferes with breathing and even complaints of shortness of breath can also occur if the enlarged tonsils have closed the respiratory tract. If the inflammation has been treated, it is possible that the tonsils will recover as before or may not even be able to return to health as before. If there is no complete healing of the tonsils, recurrent infections can occur. If this condition persists, pathogenic bacteria will nest in the tonsils and chronic inflammation occurs or what is known as chronic tonsillitis.[5]

The size of the tonsils is divided into 5 starting from T0-T0, T1-T1, T2-T2, T3-T3, and T4-T4. Size T0-T0 means no tonsil enlargement or atrophy and no air obstruction. The size of T1-T1 means a little out where the size of the tonsils is <25% of the diameter of the oropharynx measured from the left and right anterior folds. The size of T2-T2 means that the tonsils are >25% to <50% of the oropharyngeal diameter measured from the left and right anterior folds. The size of T3-T3 means that the tonsils are >50% to <75% of the oropharyngeal diameter measured from the left and right anterior folds. The size of T4-T4 means that the tonsils are >75% of the oropharyngeal diameter measured from the left and right anterior folds.[6]

The many predisposing factors for chronic tonsillitis also have an impact on the high incidence of chronic tonsillitis. As is the case with Khan's research*et al* At Khyber Hospital Peshawar Pakistan from April 2011 to May 2012, an analysis was carried out on the distribution of Ear Nose Throat (ENT) disease and found that 8980 people suffered from chronic tonsillitis (27.37%) from 32,800 total samples. In this study chronic tonsillitis is at the top of the incidence of other ENT diseases. Tarasov and Morozov also conducted health checks on children and adults, found a total of 190-230 ENT diseases per 1,000 population, and 38.4% of them suffered from chronic tonsillitis.[7,8]

World Health Organization In 2013, the number of cases of chronic tonsillitis was estimated at 287,000 children under 15 years.[9] Research conducted at Sarawak Hospital in Malaysia in the period July 2003 to June 2004, out of 657 patients with chronic tonsillitis, 342 men (52%) were found and 315 women (48%).[10]

Based on data from the Indonesian Ministry of Health in 2012, the incidence of tonsillitis in Indonesia is around 23%. Based on epidemiological data on ENT disease in seven provinces in Indonesia in September 2012, the prevalence of chronic tonsillitis was 3.8%.[11] According to Nurjannah in 2011, the distribution of the proportion of chronic tonsillitis sufferers in Medan in 2007 - 2010 based on age occurred most in the age group 11-20 years, namely 40%. Based on gender, the most were men, namely 18 samples, 51.4 % and the size of the T3 tonsil was 47.1%.[12]

Based on medical record data in 2010 at dr. M. Djamil Padang, ENT-KL Polyclinic, sub-section of the larynx and pharynx found tonsillitis in 465 of 1110 visits. The incidence of chronic tonsillitis is increasing from year to year. The incidence of chronic tonsillitis is common in children.[13] Research conducted by Shalihat in 2013 found 149 patients with chronic tonsillitis from the medical records of Dr. M. Djamil Padang. The highest frequency distribution of chronic tonsillitis patients based on age in the age group 11-20 years 70 patients (47.0%), female sex 84 patients (56.4%), tonsil size T3-T3 82 patients (55%).[14]

The relationship between age and tonsil size can be seen from the immunological activity of the tonsils. The cellular immune response in chronic tonsillitis shows an increase in antigen deposition in the tonsillar tissue. This leads to a continuous upregulation of immunocompetent cells. This is evidenced by the increased incidence of cells expressing IL-ip, TNF-a, IL-6, IL-8, IL-2,INF-Y, IL-10 and IL-4. Most are found between the ages of 3 and 10 years, consequently the tonsils are more prominent during this period and then show age-dependent involution. One or more attacks of acute tonsillitis per year is common in children of primary school age.[4]

Some researchers suspect that the tonsils and adenoids enlarge in childhood. Research using *Magnetic Resonance Imagine* (MRI) shows the tonsils and adenoids develop in proportion to the organ structures during the normal development of the child.[4] The relationship between age and tonsil size can be seen from Shalihat's study where hypertrophic tonsils were found more in patients with chronic tonsillitis aged <18 years, namely 89 patients (84.8%), while non-hypertrophic tonsils were found in those aged> 18 years, namely 21 (47.7%). After doing statistical tests with analysis*chisquare* a p-value of 0.000 was obtained.[13] The same thing was also obtained from Amalia's research which obtained p= 0.001 which shows that there is a significant relationship between age and tonsil size in patients with chronic tonsillitis.[16]

Based on the explanation above, the researcher is interested in conducting research on the correlation of age and tonsil size with the incidence of chronic tonsillitis at Aek Kanopan Hospital, North Sumatra.

II. METHOD

This study uses secondary data, namely medical records at Aek Kanopan Hospital, North Sumatra. This study is limited to the variables of gender, age and tonsil size in chronic tonsillitis. Research and data collection were carried out in November 2022 - February 2023. The research was carried out at the ENT-KL installation at Aek Kanopan Hospital, North Sumatra. This research is a form of analytical study. This research is used to find the relationship between the independent variable and the dependent variable by taking a momentary measurement. The reachable population is chronic tonsillitis patients at Aek Kanopan General Hospital, North Sumatra in November 2022 - February 2023. The inclusion criteria in this study were patients diagnosed with chronic tonsillitis and the exclusion criteria were patients diagnosed with chronic tonsillitis with complications. The sample in this study was selected using the probability method, namely*simple random sampling.* The number of samples obtained was 70 people.

III. RESULTS

In table 1, we will introduce the research characteristics which consist of information about the participants covering the age and sex ranges. By understanding the characteristics of this study, readers will gain a better understanding of the research context and the results we present. Based on table 1, the results obtained from 70 chronic tonsillitis patients show that most of them were aged 11-20 years (50%), and as many as 57.6% of patients were women and 42.4% were men.

Table 1. Characteristics of study patients

variable		n=70	%
Age category			
	0-10 Years	23	32,86
	11-20 Years	35	50,00
	21-30 Years	7	10,00
	31-40 Years	2	2,86
	41-50 Years	2	2,86
	>50 Years	1	1,43
Gender			
	Man	31	44,29
	Women	39	55,71

Based on table 2, the results obtained from 70 patients with chronic tonsillitis, mostly with tonsis T3/T3 size of 40%.

Table 2. Distribution of tonsil sizes in study patients

Tonsillitis Size	n=70	%
T1/T1	10	14,29
T2/T2	15	21,43
T3/T3	28	40,00
T4/T4	17	24,29

Based on table 3, it was found that at the age < 18 years, the most common tonsil size was in the hypertrophic group, and at the age > 18 years, the most common tonsil size was hypertrophy. These results have been carried out by merging cells and using the Spearman correlation test obtained a value of p <0.001 (p <0.05), it can be concluded that there is a correlation between age and tonsillitis size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra.

Table 3. Correlation between age and tonsil size

		Tonsil Size		
		non-hypertropics	hypertrophy	p value
		n(%)	n(%)	
age	< 18 years	22(31,42)	28(40)	<0,001
	>18 Years	3(4,28)	17(24,28)	
Total		25(35,71)	45(64,28)	

IV. DISCUSSION

Based on the research, the results obtained from 66 patients with chronic tonsillitis, mostly aged 11-20 years (50%) at Aek Kanopan Hospital, North Sumatra. The results of this study support previous research conducted by Sapitri at Raden Mattaher Hospital Jambi in 2013, the most Chronic Tonsillitis patients were in the age range of 5 - 14 years (50%). Hasanov's research*et al* In Russia, regarding the prevalence of chronic tonsillitis in families, 335 children aged 1-15 years from 321 families had chronic tonsillitis.[17] In Sembiring research*et al*in 2013 at the BLU ENT polyclinic at Prof dr. R. D. Kandou found that the most age that suffers from Chronic Tonsillitis is age <12 years.

At school age, starting from the age of 5, children are more susceptible to viral and bacterial infections from the surrounding environment. One of the predisposing factors for chronic tonsillitis is the influence of several types of food. This is because children consume foods such as foods with artificial sweeteners, contain lots of preservatives and poor oral care.[3]

Tonsil immunological function is very active between the ages of 3-10 years. Tonsil function will increase at the age of 5 years and then decrease and will increase again at the age of 10 years, then will decrease at the age of 15 years because the tonsils begin to involute at puberty so that antibody production decreases which makes them more susceptible to infection. Children and adolescents aged 5-15 years, who spend most of their time in the school environment and outdoors, often suffer from ARI.[18]

The high incidence of chronic tonsillitis in children and adolescents is because they often suffer from ARI or acute tonsillitis which are not treated adequately or left alone without treatment. Tonsillitis can be spread by hand or air contact so that children and adolescents aged 5-15 years are most likely to suffer from tonsillitis, but it can affect anyone, so this study also found patients aged <5 years and >15 years.[19]

Based on the research, the results obtained from 70 tonsillitis patients, the majority were women at Aek Kanopan Hospital, North Sumatra. The results of this study are in line with previous research conducted by Fakh, in the ENT-KL Section of RSUP Dr. M. Djamil Padang also found that most of the sexes of patients with tonsillitis were women (56%).[20] Research conducted by Kishve*et al* conduct research*case series* in India, out of 203 tonsillitis patients with the majority aged 5-14 years, more were female, namely 105 (51.72%), while men were 98 (48.28%).[21] This is in accordance with data from the prevalence of chronic diseases in the United States, it was found that the average number of chronic tonsillitis sufferers each year is more in the female sex, namely 13.7/1,000 population while men are as much as 9/1,000 population.[1-3]

Factors predisposing to chronic tonsillitis include chronic irritation (due to smoking and food), nutrition or low body resistance, the influence of weather and poor oral hygiene. During puberty when the need for calories and protein increases, women, especially teenagers, are more concerned with body shape and appearance so that many of them delay their meal schedule and even reduce the portion of food that is recommended to make their posture look perfect. This can cause malnutrition and the body's resistance to various diseases becomes very low so that more health problems occur.[22]

Akcay*et al* states that male sex is a risk factor for tonsillar hypertrophy.[23] This is due to chronic irritation factors, smoking habits and eating habits, which cause recurrent infections of the tonsils resulting in enlargement of the tonsils.[24]

Based on the research, the results obtained from 70 chronic tonsillitis patients, mostly with tonsis T3/T3 in Aek Kanopan Hospital, North Sumatra. The results of this study are in line with previous research conducted by Amalia in 2011 from 812 patients who received tonsillectomy.[16] 341 (42%) with tonsil size T3 and a study conducted by Fakh 2013 also obtained tonsil size results in children which were most commonly found in this study, namely T3 - T3 sizes (68%).[20] One of the factors for enlargement of the tonsils is due to the influence of infection in the tonsils. Enlarged tonsils due to parenchymal hyperplasia or fibrinoid degeneration with obstruction of the tonsillar crypts. Recurrent infections and obstruction of the tonsillar crypts result in increased debris and antigen stasis in the crypts, as well as a decrease in the integrity of the crypt epithelium, making it easier for bacteria to enter the tonsillar parenchyma. Bacteria that enter the tonsillar parenchyma will result in tonsillar infection. In chronic tonsillitis can be found multiplying bacteria. Bacteria that settle in the tonsillar crypts become a source of recurrent infection of the tonsils.[25]

Tonsils are lymphoid tissue that plays a role in helping the immune system. In chronic tonsillitis infection persists or recurs. Tonsils that are repeatedly infected at one time cannot kill all the germs, as a result the germs become lodged in the tonsils (focal infection). The presence of recurrent infections and focal infections causes the tonsils to work hard against germs by producing lots of immune cells so that the size of the tonsils will grow rapidly beyond normal size.[24] In chronic tonsillitis lymphocyte infiltration occurs into the epithelium of the tonsillar surface. An increase in the number of plasma cells in the subepithelium and in the interfollicular tissue. Hyperplasia and fibrotic formation of parenchymal connective tissue and lymphoid tissue result in tonsillar hypertrophy.[26]

Tonsil hypertrophy in size can cause various complaints and symptoms such as discomfort or a lump in the throat, difficulty swallowing and especially can cause airway obstruction characterized by snoring, frequent drowsiness, anxiety, lack of attention and decreased learning achievement. This is what usually encourages patients to seek treatment.[24]

Based on this study, it was found that at the age < 18 years, the most common tonsil size was Hypertrophy and at the age > 18 years, the most common tonsil size was Hypertrophy. These results have been carried out by merging cells and using the Spearman rho test obtained a value of $p < 0.001$ ($p < 0.05$), it can be concluded that there is a correlation between age and tonsillitis size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra.

The results of this study are in accordance with previous research conducted by Amalia, 2011 which obtained $p = 0.001$ which shows that there is a significant relationship between age and tonsil size,[16] and the research by Shalihat, 2013 which also obtained the results of a significant relationship between age and tonsil size.

The difference in the results of the research is in the positive significance relationship. In this study, it was found that the higher the age, the greater the size of the tonsils with a significant relationship p = 0.000

Tonsil immune activity is maximal between the ages of 3 and 10 years, therefore the size of the tonsils is greatest at the age of children. The tonsils begin to gradually involute at puberty.[13] Akcay Research*et al*found in school children with tonsil sizes T2 and T3 showed a decrease in number as they got older.[23] Crombie and Barr in Shalihat, 2013 stated that there is a tendency for the size of the tonsils to be relatively small at the age of <7 years and to enlarge at the age of 7-15 years, while those in old age have small tonsil sizes.[14]

In a study of tonsil size in the age range of 3-10 years, T3-T3 sizes were obtained. However, this size increases with increasing age which is contrary to the immune activity of the tonsils. The results showed that adults also experience enlarged tonsils with sizes T3-T3 and T4-T4.

The cellular immune response in chronic tonsillitis shows an increase in antigen deposition in the tonsillar tissue. This leads to a continuous upregulation of immunocompetent cells. This is evidenced by the increased incidence of cells expressing IL-ip, TNF-a, IL-6, IL-8, IL-2,INF-ʏ, IL-10 and IL-4, which are mostly found between the ages of 3 and 10 years. During this period the tonsils are consequently more prominent and then show age dependent involution. One or more attacks of acute tonsillitis per year is common in children of primary school age.[7]

Tonsils undergo involution at puberty, but this can be hampered if the tonsillar tissues and cells are not permanently damaged. Children who experience acute tonsillitis with adequate treatment are at lower risk of experiencing enlarged tonsils compared to patients who experience recurrent tonsillitis or chronic tonsillitis. Damage to tonsillar cells and tissues in chronic tonsillitis can be temporary or permanent. Tonsil tissue that is permanently damaged will be replaced with scar tissue so that not all of the tonsillar tissue experiences involution.[27]

Tonsil action decreases with increasing age. The aging process results in decreased organ work and the sensitivity of the immune system, one of which is the tonsils. Decreased sensitivity causes the components of the immune system to be unable to distinguish normal cells from abnormal cells which results in the tonsils not being able to carry out its function optimally to capture and collect foreign bodies effectively and as an organ for the production of antibodies and the sensitivity of T lymphocyte cells to specific antigens.[28] This decrease in sensitivity causes bacteria to easily infect the tonsil organs which will lead to an inflammatory reaction of the tonsils which is characterized by an abnormal enlargement of the tonsil size.

Ni made Putri et al stated that long ago*exposure* tonsillitis patients against risk factors causing enlarged tonsils.*Oral hygine* A poor diet is one of the risk factors for enlarged tonsils.*Oral hygine* A bad diet can increase the risk of developing tonsillitis regardless of age and gender. Coupled with a decrease in the body's immunity with age, it also has an effect on enlarged tonsils. The combination of these two things can give an overview of enlarged T3-T4 tonsils in adults and the elderly.[29] Smoking also causes a decrease in antibodies in the tonsils, the function of the tonsils is that when a pathogen penetrates the epithelial layer, the mononuclear phagocytosic cells will recognize and eliminate antigens, resulting in impaired function of the body's defense cells. Then the particles in cigarette smoke stimulate the tonsils to produce antigen, if the tonsils continue will be inflamed.[30] Toxic components in cigarettes can irritate the soft tissues of the oral cavity, and cause mucosal infections, slow wound healing, suppress osteoblast proliferation.[31]

Antibiotic therapy in chronic tonsillitis often fails to reduce and prevent recurrence of infection, either due to failure of penetration of antibiotics into the tonsillar parenchyma or inaccuracy of antibiotics and left alone. The use of antibiotics that are careless or not properly dosed can fail therapy and can also cause resistance.[5,12] Resistance in question is a condition in which microbial life is not disturbed at all by the presence of antibiotics, as a result the bacteria continue to multiply and cause chronic hypertrophic tonsillitis caused by repeated infections.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research on the correlation of age with tonsillitis size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra, it can be concluded that the most chronic tonsillitis sufferers are women (57.6%). Most people who experience tonsillitis are at the age of 11-20 years (50%). Most have tonsil size T3/T3, namely (40.9%). There is a relationship between age and tonsillitis size in chronic tonsillitis at the Aek Kanopan District General Hospital, North Sumatra, p=0.000 (p<0.05). Suggestions from researchers are that it is hoped that the community can increase awareness about the importance of oral hygiene and knowledge about how to use antibiotics according to doctor's directions.

For future researchers, it is hoped that the results of the research will serve as a scientific source of information and it is hoped that future research can conduct research to look for risk factors for enlarged tonsils in adulthood.

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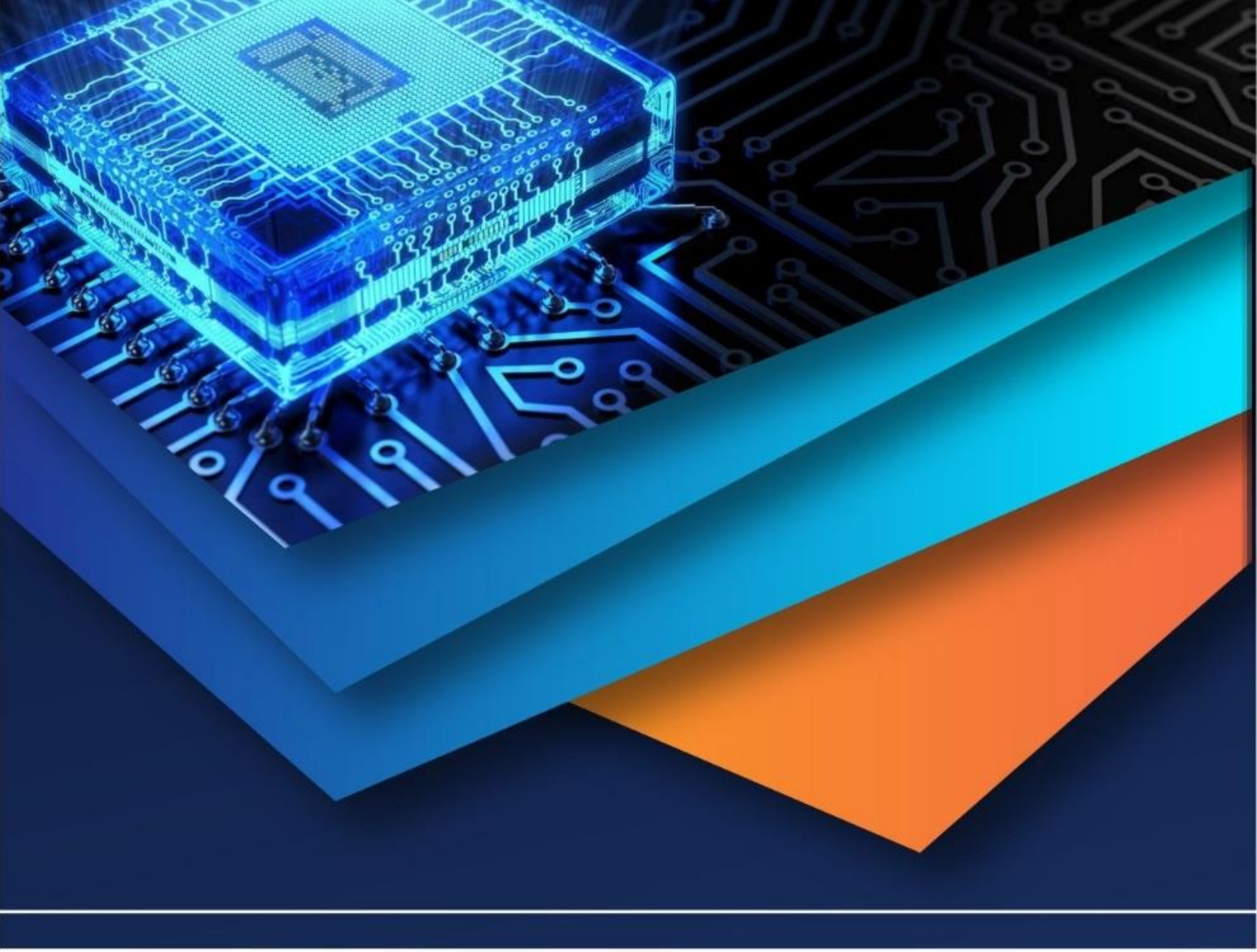

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