Original Article

Immunoglobulin Levels Pak Armed Forces Med J 2011; 61 (4): 594-7

COMPARISON OF SERUM IMMUNOGLOBULIN LEVELS BEFORE AND AFTER ADENOTONSILLECTOMY AND TONSILLECTOMY

Shahid Bin Faiz, Asad Qayyum*, Atif Najam*

FC Hospital Quetta, *Combined Military Hospital Peshawar

ABSTRACT

Objective: To compare the pre and post-operative serum immunoglobulin levels in patients undergoing tonsillectomy and adenotonsillectomy.

Study Design: Quasi-Experimental Study

Place and Duration of the Study: ENT Department, Combined Military Hospital, Rawalpindi from Febuary 2006 to December 2007

Patients and Methods: Study included 50 patients of adenotonsillectomy and tonsillectomy. Two patients were excluded, because they did not report to the hospital for postoperative investigations. Preoperative serum IgG and IgA levels were measured two weeks before surgery and post operative samples were taken two months after the surgery.

Results: Mean age of the patients was 8.8 years, with maximum patients of 12 years of age (35.4%). There were 36 (75%) male and 12 (25%) female patients. Tonsillectomy was done in 30 (62.5%) patients and adenotonsillectomy in 18 (37.5%) patients. Mean age of patient in case of adenotonsillectomy was 7.17 year and for tonsillectomy 9.9 years. There was a significant rise in the post operative serum IgA level (p= 0.02) while it was insignificant in case of IgG (p= 0.44).

Conclusion: Our study shows a significant rise in the post operative serum IgA level (p= 0.02).

Keywords: Adenotonsillectomy, Immunoglobulins, Tonsillectomy.

INTRODUCTION

Tonsillectomy and Adenotonsillectomy are the most commonly performed operations in ENT practice and their complications have been studied extensively in order to minimize risk to the patients. Thorough history and physical examination is mandatory and these procedures are required in cases where the medical therapy has failed to control the disease. Preoperative assessment, clean surgery, meticulous hemostasis and post operative care remain the pillars of a successful surgery. Any deviation from these set patterns results in increased chances of complications. Commonly encountered complications are haemorrhage, infection, pain and recurrence of the symptoms due to inadequate removal of the lymphoid tissue[1]. Preoperative assessment of immunoglobulins is not done routinely unless indicated clinically. The effects of adenotonsillectomy on the cellular and humoral immunity of the children have not been studied extensively[2,3]. Removal of tonsils and adenoid compromises the protection of upper airway resulting in immunodeficiency; remains a subject of debate[4]. Available data shows that the immunoglobulins level does not fall below the normal level after tonsillectomy/ adenotonsillectomy and even if the level drops, it is mostly transient and insignificant[5]. Most of the data available on this particular subject is taken from studies carried out abroad. We compared levels in patients undergoing tonsillectomy/ adenotonsillectomy.

Correspondence: Major Shahid Bin Faiz, ENT Department, FC Hospital Quetta

Received: 22 Aug 2009; Accepted: 01 Feb 2011

PATIENTS AND METHODS

This study was conducted in ENT Department, Combined Military Hospital Rawalpindi, from February 2006 to December 2007. The research work was also supported by Armed Forces Institute of Pathology; Rawalpindi. The sample consisted of 50 patients. Children between 4 to 12 years of age, undergoing tonsillectomy or adenotonsillectomy were included. Informed consent was obtained from the patients guardians. Serum IgG and IgA levels were assessed two weeks before operation. Post operatively; patients were administered intravenous antibiotic (co--amoxicillin /

clavulanic acid) for 24 hours and then shifted to the oral preparation for the next 5 days. Postoperative serum levels of IgG and IgA were assessed after two months in follow up visit, considering the fact that plasma half life of serum IgG is three weeks and that of serum IgA about one week.

RESULTS

A total of 50 patients undergoing tonsillectomy / adenotonsillectomy were included. Two patients (4%) were lost to follow-up and were excluded. The mean age of patients was 8.8 years. Maximum patients (35.4%) were of 12 years of age, as shown in table 1. Out of 48 patients, 36 (75%) were males and 12 (25%) females as shown in table 2. Tonsillectomy was done in 30 (62.5%) patients and adenotonsillectomy in 18 (37.5%) patients as depicted in fig. Mean age of the patients undergoing adenotonsillectomy was 7.17 years and tonsillectomy was 9.9 years. Data was analyzed using SPSS-15, descriptive statistics were used to describe the data. Paired sample t-test was applied as the test of significance. There was a significant rise in the post operative IgA level (p= 0.02) which was not observed in case of IgG, as is evident from table 3.

DISCUSSION

This study was done with the aim to find out any change in post- operative serum immunoglobulin levels after tonsillectomy / adenotonsillectomy. Increase in serum IgA was not influenced by age and gender of the patient, season in which the surgery was carried out, or the type of surgery (tonsillectomy/ adenotonsillectomy) performed. There is similarity with the different studies that the serum immunoglobulin levels which include both IgA and IgG never dropped below the normal range post operatively. Majority of the authors affirm insignificant reduction in the serum levels of immunoglobulins[6,7]. Others had pointed out a decrease in the serum immunoglobulin levels that can affect the immunity of the child[7,8]. Decrease in immunoglobulin levels after surgical procedures like tonsillectomy and adenotonsillectomy have been found in patients with IgA- glomerulonephritis and those who had polio vaccination[9,10] .

A study on 102 patients of adenotonsillectomy in Iran showed statistically significant increase in the post operative serum IgA levels[11]. In this study a comparison was made between the pre and post operative serum IgG, IgA and IgM. Pre operative samples were taken 24 hours before

Table-1: Age of the patient (n=48)

No	Age (Years)	Frequency	Percent
1	4	4	8.3
2	5	4	8.3
3	6	7	14.6
4	7	3	6.3
5	8	3	6.3
6	9	3	6.3
7	10	5	10.4
8	11	2	4.2
9	12	17	35.4
	Total	**48**	**100.0**

Table-2: Distribution of Gender (n=48)

S.No	Gender	Frequency	Percent
1	Male	36	75.0
2	female	12	25.0
	Total	**48**	**100.0**

Table-3: Description of IgA and IgG levels Pre and Post operatively (n= 48)

	Preoperative	Postoperative	*P*- value
IgA (mean±SD)	2.32± 1.19	2.90± 1.48	**0.022**
IgG (mean±SD)	12.23± 3.18	12.64± 2.57	**0.441**

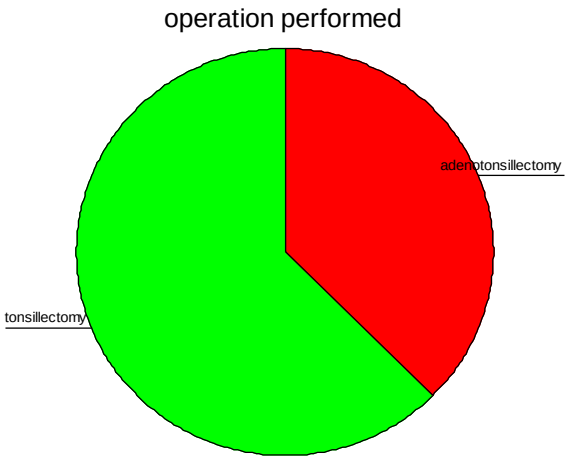

Figure: Pie Chart Showing the Frequency of Two Procedures

the surgery and post operative samples were taken 2 and 8 weeks after the surgery. Our results are quite comparable with this study as post operative rise in serum IgA was observed in our study as well. The possible reasons could be that both of these studies were carried out in almost same geographical region having similar genetic factors, racial factors, general health of the patients, dietary factors, climatic conditions and variation in exposure to different types of pathogens.

IgA levels were assessed in the serum and saliva of the patients undergoing tonsillectomy in a study conducted by Childers and colleagues[12]. The result of the study showed that there was significantly higher salivary IgA level mainly in the first year after tonsillectomy. These findings are in agreement to the results of our study which also showed statistically significant increase in the serum IgA levels after tonsillectomy/adenotonsillectomy. Although in our study the assessment of the IgA was done only in the serum; and salivary IgA levels were not assessed.

The immunomodulatory role of the tonsil was studied by Sainz et al, in 1992, which showed that there is an increased synthesis of immunoglobulins by the lymphocytes after tonsillectomy. It was concluded that tonsillectomy does not have counter productive effect on the immune system. Rather it seems to improve the immune response, mainly by unblocking the suppression to which the immune system was subjected[13].

Amoros conducted a similar study, in 2004, on 89 healthy children in which the impact of the tonsillar surgery on the serum immunoglobulins was analyzed[14]. He concluded that IgG levels fall after the surgery but recover to normal levels in 4 months period. Possible explanation to this could be that the post operative serum immunoglobulins levels were assessed 4 months after the surgery, where as in our study the post operative levels were assessed 2 months after the surgery.

Similarly increase in the lymphocytes had been observed after tonsillectomy by Bock and colleagues, in 160 children undergoing tonsillectomy. An increase in lymphocytes count mainly in the tosillectomized boys was observed, where as the count remained unchanged in female patients[15]. However, in our study no significant correlation between the gender and serum immunoglobulins levels was observed.

In all of the above mentioned studies there were variations in the sample size, inclusion and exclusion criteria, post operative management protocol and the time period for collecting pre and post operative samples. All patients were given parenteral antibiotics for 24 hours followed by a course of oral antibiotics for 5 days as per protocol. As most of the patients were of low socioeconomic status, poor compliance to postoperative antibiotic can be a factor for the increased serum immunoglobulins level. Removal of tonsils and adenoid may facilitate the pathogens to adhere and colonize on the pharyngeal mucosa. This in turn results in increased production of immunoglobulin mainly IgA by the lymphoid tissue of the body. This means that the individual has been made susceptible to invading pathogens and is likely to experience more respiratory tract infections as compared to normal individuals. The results of our study was also supported by another international study[5].

CONCLUSION

Adenotonsillectomy is a very commonly performed surgery in ENT. Our study shows a significant rise in the post operative serum IgA level (p= 0.02). The research work on this subject in our country is very sparse and further research is needed to make accurate assessment about the effects of adenotonsillectomy on the immunity of the patient.

REFERENCES

1. Zakirullah.Post-tonsillectomy and adenotosillectomy morbidity and complications at district headquater hospital daggar. J Ayub Med Coll Abotabad. 2001;13:3-6
2. Cantani A, Bellioni P, Salvinelli F, Businco L. Serum immunoglobulins and secretory IgA deficiency in tonsillectomized children.Ann.Allergy 1986; 57:413-16
3. Gogoi D, Gupta O.P,Agarwal M.K, Gupta RM . Immunological evaluation of children undergoing tonsillectomy.J.Otolaryngol 1979; 8:508-14
4. Boyaka PN, Wright M, Marinaro M, Kiyono H,Johnson JE, Gonzales RA,et al. Human nasopharyngeal associated lymphoreticular

tissues.Functional analysis of subepithelial and intraepithelial B and T cells from adenoids and tonsils. AM.J.Pathol.2000; 157:2023-35

5. lkinciogullani A, Dogu F, Ikinciogullani A. Egin Y, Babacan E. Is immune system influenced by Adenotonsillectomy in children? Int j pediatr otorhinolaryngol 2002 2; 66(3):251-7

6. Zielnik-Jurkiewicz B,Jurkiewicz D. Implications of immunological abnormalities after adenotonsillectomy. Int J paedtrotolaryngol 2002 17; 64(2):127-132

7. Friday GA, Paradise JL. Rabin BS. Colbom DK, Taylor FH. Serum immunoglobulin changes in relation to tonsil and adenoid surgery. Ann Allergy 1992:69 (3):225-230.

8. Del Rio Navarro B. Immunological effects of tonsillectomy/adenectomy in children. Advances in Experimental Medicine and Biology 1995:371:737-9

9. Tamura S, Masuda Y, lnokuchi I. Terazawa K, Sugiyama N. Effect of and indication for tonsillectomy in IgA nephropathy. Acta Otolaryngol Suppl 1993,508:23-8.

10. Masuda Y, Terazawa K. Kawakams S, Ogura Y. Sugiyama N. Clinical and Immunological study of igA nephropathy before and after tonsillectomy- Acta Otolaryngol Suppl 1988; 454:248-255.

11. Faramarzi A,Shemseddin A,Ghaderi A.Iran J Immunol 2006 Dec ;3(4):187-91

12. Childers NK,Powell WD,Tong G,Kirk K,Wiatrak B,Michalek SM.Human salivary immunoglobulin and antigen-specific activity after tonsillectomy.Oral Microbiol Immunol.2001;16;265

13. Sainz M, Guterrez F, Moreno PM, Munoz C,Ciges M.Changes in immunologic response in tonsillectomized children.Clin Otolaryngol 1992;17:376-9

14. Amoros Sebastia LI,Ferrer Ramirez MJ,Lopez Molla C,Carrasco Llatas M,Pla Mochili A,Diaz Ruiz M,Estelles Ferriol JE,Lopez Martinez R.Changes in immunoglobulin levels following adenoidectomy and tonsillectomy .Acta Otorhinolaryngol Esp.2004;55:404-8

15. Bock A, Popp W, Herkner K. Tonsillectomy and the immune system:a long term follow up comparison between tonsillectomized and non children. Tonsillectomized. Arch.Otorhinolaryngol 1994; 251:423-27.