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Eosinophiliccationic Protein Determination in Serum Samples of Patients with Otitis Media

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Abstract
Background: Eosinophiliccataionic protein (Ecp) also known as Ribonuclease III (RNase III) is a protein which have bactericidal and antiviral properties{1} . It is released by activated eosinophil.it is regarded as biochemical marker of inflammation. **Objectives:** The aim of this study was to estimate the levels of Eosinophiliccataionic protein (Ecp) in the sera of patients with otitis media. **Methods:**Sixty patients complaining of signs and symptoms of otitis media submitted for assessment (eleven patients had otitis media with effusion).All sera and effusion were included for estimation of Ribonuclease III and Alkaline phosphatase enzymes.**Results:** Results found that levels of Ribonuclease III enzyme were increased in most of otitis media patientsincluding those with effusion.Alkaline phosphatase was also estimated and showed normal values,but it was absent ineffusion samples.Conclusion: From the results of this study we can concluded that Eosinophilic cationic enzyme (ECP) or Ribonuclese III is present in cases of Otitis media with or without effusion. The enzyme may be secreted from bacteria causing Otitis media or from eosinophil causing effusion which may indicate allergic reaction and cause. Further study of cases of otitis media with or without effusion, different sexes and age groups to confirm the presence and role of the enzyme.
Keywords:Eosinophilic cationic protein,Otitis media,Alkaline phosphatase, Patients.

Introduction

Otitis media is a common disease affecting all age groups, both sexes.Eosinophiliccataionic protein (Ecp) also known as RibonucleaseIII(RNaseIII) is a protein which have bactericidal and antiviral properties{1}. It is released by activated eosinophil.it is regarded as biochemical marker of inflammation {2}

It is confirmed that this enzyme is present in high concentration in cases of allergy and asthma {3}.There are three glycosylated forms of this enzyme with molecular weight ranging from 18-22kDa.{4}

RNaseIII enzymes are highly conserved in the bacteria and in eukaryotes and their classification depends on their sources; For instance Escherichia coli RNaseIII(RNaseIII;E(3.1.24)(10}.

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It is a double –stranded-RNA specific endonuclease and is a member of structurally distinct super family[3] .

There are many enzymes secreted during otitis media such as 2-mocroglobulin and anti-leukocytes protease[6] but there is no study available related to the role of RNaseIII in middle ear infection.

The aim of this study was to estimate the levels of Eosinophiliccataionic protein (Ecp) in the sera of patients with otitis media.

Materials and Methods

Sixty patients were complaining of signs and symptoms of otitis media with or without middle ear effusion during the period from April to July 2020. Patients were submitted for examination of their sera to estimate the levels of Eosinophilic cationic enzyme (ECP); Ribonuclease III. The effusion of the middle ear was aspirated,all samples were examined by Al-Hayat lab In Hilla city, Iraq.Eleven patients had otitis media with effusion while the rest 49 patients were without effusion.

Enzyme-linked immunosorbent assay (ELIZA) Kit (Sigma-Aldrich, USA) was usedto estimate the level of Ribonuclease III. Alkaline phosphatase enzyme was also estimated which showed normal level in Otitis media patient and absent in otitis media with effusion.

Ethical consideration

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee.

Results

ELIZA Kits were used to detect the level of the enzyme. Normal range of the enzyme in the serum is below 32.5 mg/ml.

The presence of the enzyme in the ear effusion is regarded as positive regardless the enzyme level.

The results of the enzyme level in the sera of all patients were shown in (Table 1).

We found that the RNasseIII in the sera of all patients wassignificantly increased when compared to control group.

Table I:RNase III level in the sera of patients with O.M and in the control group

Enzyme level	Mean ± SD		P value
	Patient(60)	Control(20)	
RNase III	60.7±8.1	8.3±4.4	0.01
Alkaline phosphate	43.6±18.8	30.7±14.9	0.212

Also the effusions of middle ear of all eleven patients were submitted for the detection of the enzyme(below and above normal level).The results were scored as positive regardless the amount of the level of the enzyme.The results reflect the presence of inflammation or allergy.

Alkaline phosphatase enzyme was also estimated which showed normal level in Otitis media patient and absent in otitis media with effusion (Table 2).

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Table II: RNase III level in the effusion samples

Tests	Mean ± SD	P value
RNase III(11 sample)	29±9.6	0.016
Alkaline phosphate	0	

Discussion

The presence of Eosinophilic cationic enzyme in Otitis media cases may indicate inflammatory process which indicate the source of the enzyme was from pathogenic bacteria causing Otitis media[{4}] or eosinophil[(5)].

Eosinophilic cationic enzyme was seen increasing in allergic cases and this may be attributed to the effect of eosinophil which produce this protein[{6},(7)].

Although there are confirmatory results indicating elevation of some hydrolases enzymes in middle ear effusion [{8},(9)],but this elevation was not significant in the present study.

Sun,W,Pertzev[{10}] indicate that alkaline phosphatase in the effusion released from middle ear mucosa, while Torres T Carlson.K.L.[(11)]indicate that the secretion was from inflammatory cells present in the effusion.Cheng[(12)] also confirm the same result.

Our study correlate with that of and) Torres T Carlson. [(11)] and Cheng [(12] who mentioned that the origin of RNaseIII was from eosinophil.

Conclusion

From the results of this study we can concluded that Eosinophilic cationic enzyme (ECP) or Ribonuclese III is present in cases of Otitis media with or without effusion. The enzyme may be secreted from bacteria causing Otitis media or from eosinophil causing effusion which may indicate allergic reaction and cause.Further study of cases of otitis media with or without effusion,different sexes and age groups to confirm the presence and role of the enzyme.

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