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The research hotspots analysis of Hepatitis treatment by PubMed

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ABSTRACT

Objective: To understand the research hotspots of Hepatitis treatment by PubMed. Methods: With MS Excel, SPSS, Cytoscape software, we took MeSH (Medical Subject Headings) word frequency analysis, clustering analysis, co-word network graph of PubMed papers. Results: It shows that the current Hepatitis treatment research hotspots had focus on Antiviral, immunity, transplantation, etc, also the most importance of which was the Antiviral. Conclusion: It is helpful and timesaving for researcher or doctor to understand the research hotspots in Hepatitis treatment.

KEYWORDS

Hepatitis;
Treatment;
Word frequency analysis;
Clustering analysis;
Co-word network graph;
Antiviral.

INTRODUCTION

There are about 2 billion people around the world who have been infected with the hepatitis b virus, including more than 350 million people suffering from chronic infection, 500000 to 700000 people each year die from hepatitis b virus infection. About 130 to 170 million people have been infected with chronic hepatitis c virus (HCV), an estimated 350000 people have died of liver disease associated with hepatitis c[4].

Hepatitis treatment mainly involved in the research of antiviral and anti immunity, transplantation, vaccine, ect, we hope that through this research the analysis of the MeSH can draw the outline of hepatitis treatment research hotspot.

Therefore this research retrieved the hepatitis papers of PubMed (http://www.ncbi.nlm.nih.gov/pubmed) within recent five years, got 21786 papers, and analyzed MeSH of above papers using Co-word Analysis[5].

MATERIALS AND METHODS

First, we retrieved PubMed papers with publication dates between 27 February 2008 and 27 February 2013. Second, search terms was "Hepatitis"[Mesh] AND ("2008/02/27"[PDat] : "2013/02/27"[PDat]). Third, using Microsoft Excel we recorded All MeSH terms of above papers, and sort and filter the terms, and looked for the high frequency terms (occurrences), and we also counted occurrences of two high frequency terms together in the same paper, setting up the original co-word matrix. Fourth, the statistical analysis: we made MeSH term's clustering analysis using SPSS13.0 statistical software, draw the co-word network graph of the high frequency terms using Cytoscape software[3].

FULL PAPER

THE MESH TERMS ANALYSIS OF PAPERS ABOUT HEPATITIS TREATMENT

The MeSH terms word frequency analysis

We retrieved 21786 papers, every paper has MeSH terms, we extracted MeSH terms and established the MeSH terms database. We got 24 MeSH terms of treatment which occurrences frequency was over 270 (including 270). From TABLE 1, we can infered some ideas:the relevant research of hepatitis treatment hotspots mainly concentrated in the Antiviral, immunity, transplantation, etc, it also suggests that Antiviral has become hepatitis treatment most major research hotspots.

TABLE 1 : The top 24 MeSH terms about hepatitis treatment

Ranking	MeSH terms	Occurrences Frequency (times)
1	Antiviral Agents	5579
2	Interferon-alpha	2729
3	Ribavirin	2322
4	Recombinant Proteins	2267
5	Polyethylene Glycols	2022
6	Liver Transplantation	1389
7	Alanine Transaminase	1040
8	Hepatitis B Vaccines	897
9	Hepatitis C Antibodies	790
10	Hepatitis B Antibodies	766
11	Lamivudine	762
12	Interferons	620
13	Immunosuppressive Agents	589
14	Organophosphonates	514
15	Adenine	511
16	Vaccination	438
17	Interleukins	431
18	Immunoglobulin G	393
19	Guanine	389
20	Interferon-gamma	313
21	Tumor Necrosis Factor-alpha	300
22	Anti-HIV Agents	286
23	Antiretroviral Therapy, Highly Active	282
24	Hepatitis Antibodies	270

Clustering analysis of the high frequency MeSH terms

This research used hierarchical clustering analysis which is one of the most commonly used Classify analysis to analyze the above 24 MeSH terms, drew a dendrogram, and the results were shown in Figure 1.

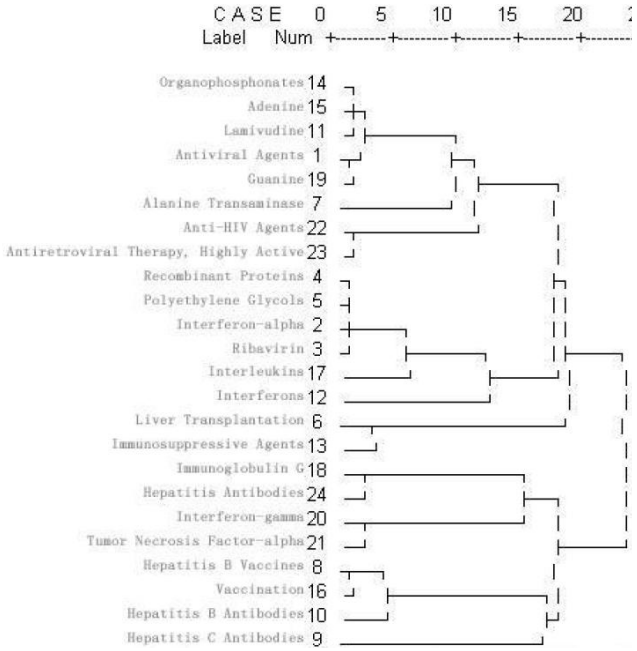

Figure 1 : Hierarchical clustering analysis dendrogram of MeSH terms

From the Figure 1, in addition to individual MeSH term as "Ribavirin; Polyethylene Glycols;", we could seen the other high frequency MeSH terms could be divided into the following five groups. Group 1 contains MeSH terms (Organophosphonates; Adenine; Lamivudine; Antiviral Agents; Guanine; Alanine Transaminase; Anti-HIV Agents; Antiretroviral Therapy, Highly Active), it suggests that Organophosphonates, Adenine, Lamivudine[2], Antiviral Agents, Guanine, Anti-HIV Agents, Antiretroviral Therapy are all connected with Alanine Transaminase. Group 2 contains MeSH terms (Recombinant Proteins; Interferon-alpha; Interleukins; Interferons), it suggests that Interferon-alpha, Interleukins and Interferons are made by using the recombinant protein production technology. Group 3 contains MeSH terms (Liver Transplantation; Immunosuppressive Agents), it suggests that Liver Transplantation need Immunosuppressive Agents. Group 4 contains MeSH terms (Immunoglobulin G; Hepatitis Antibodies; Interferon-gamma; Tumor Necrosis Factor-al-

pha), it suggests that they all have some relevance in immunoregulation, it also suggests that Tumor Necrosis Factor-alpha maybe have some relevance in immunoregulation[1]. Group 5 contains MeSH terms (Hepatitis B Vaccines; Vaccination; Hepatitis B Antibodies; Hepatitis C Antibodies), it suggests that the Vaccination of Hepatitis Vaccines stimulate the body to produce antibodies.

The above clustering results suggest that several MeSH terms within one group have certain inherent logic connection between eachother; If there are no known correlation between the MeSH terms, it indicates we find a new research hotspot.

Co-word network graph of the high frequency MeSH terms pair

By analyzing MeSH terms of the top 13 (word frequency), we got the top 10 MeSH terms pair (A and B, see TABLE 2) and co-word network graph of the MeSH terms pair (see Figure 2). Especially the first MeSH terms pair of Antiviral Agents and Interferon-alpha appeared 2403 times in the same paper, it was far higher than that of the second MeSH terms pair (2154 times, Antiviral Agents and Ribavirin).

TABLE 2 : The top 10 MeSH terms pair

Ranking	MeSH terms A	MeSH terms B	Co-word occurrences frequency (times)
1	Antiviral Agents	Interferon-alpha	2403
2	Antiviral Agents	Ribavirin	2154
3	Interferon-alpha	Recombinant Proteins	2133
4	Antiviral Agents	Recombinant Proteins	2005
5	Interferon-alpha	Polyethylene Glycols	1969
6	Recombinant Proteins	Polyethylene Glycols	1929
7	Interferon-alpha	Ribavirin	1923
8	Antiviral Agents	Polyethylene Glycols	1859
9	Ribavirin	Recombinant Proteins	1690
10	Ribavirin	Polyethylene Glycols	1622

In Figure 2 the edge represents the concurrence relationship between MeSH terms pair and if the edge between one MeSH term to other MeSH term, it suggests that the one MeSH term is more important, it is in the center of the research hotspots. So we could infer that Antiviral and immunity are the research hotspots now.

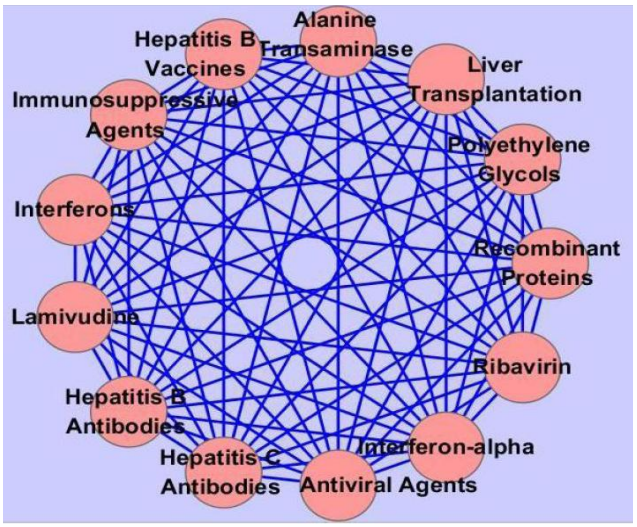

Figure 2 : Co-word network graph of the high frequency MeSH terms pair

CONCLUDING REMARKS

By analyzing MeSH terms (word frequency analysis, clustering analysis, co-word network graph) of PubMed papers about hepatitis, we could infer that the current Hepatitis treatment research hotspots had focus on Antiviral, immunoregulation, transplantation, etc, also the most importance of which was the Antiviral.

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