

Seroepidemiology of Hepatitis A Virus in Iranian Soldiers in 2006: Do They Need Vaccination?

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Background and Aims: Since hepatitis A virus is a contagious viral infection, crowded military quarters are a fertile ground for the spread of this disease. This study sought to evaluate immunity against hepatitis A virus among Iranian military draftees so as to determine whether or not universal vaccination for the armed forces is necessary.

Methods: This cross-sectional study randomly selected 800 army draftees in Tehran, the capital city of Iran in 2006. Demographic data, namely age, occupation before call-up, education, and time of in-service, were collected. Five ml of blood was taken from all the subjects; the blood samples were then centrifuged and their serum was examined by the Elisa test with a broad test of Abbott-hepatitis A virus AB META-AXSYM system for total hepatitis A virus antibody. The data were subsequently analyzed with SPSS software, t-test, and Mann-Whitney's test. $P < 0.05$ was considered significant.

Results: All the 800 soldiers were male with a mean age of $19 \pm 1SD$ years, and 702 (88%) of them were holders of a high school diploma with the rest being school dropouts. 781 (97.63%) of the subjects had anti-hepatitis A virus antibody while the other 19 (2.37%) did not.

Conclusions: That 97.63% of the army draftees recruited into our study were immune to hepatitis A virus is an indication that vaccination for hepatitis A is not necessary for Iranian military conscripts at this juncture.

Keywords: Soldiers, Hepatitis A Virus, Antibody, Vaccination

Introduction

Hepatitis A is an acute, usually self-limiting viral infection of the liver. An estimated 1.5 million clinical cases of hepatitis A virus infection occur each year. The incidence of hepatitis A virus is closely related to socioeconomic development, and seroepidemiological studies show that the prevalence of anti-hepatitis A virus antibodies in the general population varies from 15 to 100% in different parts of the world ⁽¹⁾. Fecal-oral route, transmitting hepatitis A virus from person to person, is closely associated with poor sanitary conditions. The most common modes of transmission include close contact with an infected person and ingestion of contaminated food and water ⁽¹⁻³⁾. Antibodies against hepatitis A virus develop in response to infection, and seroprevalence can be used as a marker of viral transmission in a community. In adults, hepatitis A infection is more symptomatic and is more probable to have a fulminant prognosis.

Furthermore, this infection in areas with low endemic disease occurs mainly in adults in high-risk groups such as homosexual men, injecting drug users, and those traveling to countries with high endemic disease. In areas with low endemic disease, outbreaks can occasionally occur via food and water, rendering a relatively large proportion of the adult population susceptible to hepatitis A virus and it is more symptomatic in adults and may be fulminant

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in them. Since vaccination is the best means for hepatitis A prophylaxis (9-11), childhood vaccination assumes a greater significance in reducing the burden on health systems (8-9).

The current study is aimed at evaluating the immune state of Iranian army draftees against hepatitis A virus to determine whether universal vaccination against this infection is necessary for them.

Materials and Methods

This is a cross-sectional study, carried out in 800 randomly-selected army draftees in Tehran, Iran in 2006. Demographic data comprised age, occupation before the draft, education, and time of in-service. Five ml of blood was taken from all the subjects; the blood was centrifuged and the serum was examined by the Elisa test for total anti-hepatitis A virus antibody with a broad test of Abbott-hepatitis A virus AB META-AXSYM system, manufactured in Germany. The data were analyzed with SPSS software. The frequency of anti-hepatitis A virus antibody was determined, and the association between the demographic information was analyzed. Statistical analyses were performed with t-test or Mann-Whitney's test; $p < 0.05$ was considered significant.

Results

All the 800 subjects were male with a mean age of 19 ± 1 SD years. 781 (97.63%) had anti-hepatitis A virus antibody while the other 19 (2.37%) did not. Length of time in-service was 3.34 ± 2 months. While 702 (88%) of the cases had a high school diploma, the rest were school dropouts. The demographic data had no significant relation with anti-hepatitis A virus antibody.

Discussion

Hepatitis A viral infection can be superinfected or coinfecting with other viral infections and is one of the most widespread liver infections in the world, particularly in developing countries. In Iran, the most common cause of acute hepatitis is hepatitis A (26). Lankarani *et al.* reported that in healthy hepatitis B carriers, anti HAV antibody totaled 79% of the Iranians studied (28). Viral hepatitis A and its complications are known to undermine the readiness of military soldiers. Crowded military

barracks increase the likelihood of fecal-oral infection, paving the way for the concurrence of viral and bacterial infections (25). Hepatitis A virus is reported to be a health problem for army soldiers in low endemic areas (8, 9, 15, 17), where transmission occurs primarily from person to person in the community. Nonetheless, 97.63% of our army draftees had anti-hepatitis A virus antibody, which tallies with the results of some similar studies (12, 14, 24).

Bader TF (14) maintains that prescreening for immunity is likely to be cost-effective in developed countries' adult population because seropositivity of hepatitis A is low. On account of the fact that the adult soldiers in our study were immune against hepatitis A, we cannot see the necessity for such measures at this juncture.

Epidemics of hepatitis A virus arise especially in countries afflicted with poor hygiene and massive water pollution, and non-immune young travelers to these countries should consider prophylaxis before traveling. The results of our study, showing that young Iranian army soldiers are immune to hepatitis A and that traveling to endemic areas does not pose a health threat to them, do not chime with the results of a study by Laurichesse *et al.* (18).

We were unable to confirm a relationship between occupation and anti-hepatitis A virus antibody owing to the fact that the majority of our subjects had just finished high school before conscription. It is noteworthy that many other studies have previously highlighted the risk of hepatitis A virus infection based on the potential for contact with infected materials among daycare providers, hospital workers, sewage workers, and military forces (21-22).

Men are generally more likely to be at risk of hepatitis A virus infection than are women. We were not able to determine an association between anti-hepatitis A virus antibody and sex because all army conscripts in Iran are male. There are other relevant studies that did not face such limitations (22-23).

In addition, the fact that our subjects were adult soldiers meant that we could not assess the association between age and anti-hepatitis A virus antibody. However, it has already been established that children are prone to hepatitis A in developing countries and that post-exposure prophylaxis against hepatitis A is needed (5, 8, 27).

Vaccination is at present the best means for hepatitis A prophylaxis for such high-risk groups as military personnel (6-7). Nevertheless, for a seronegative person in the military forces of countries in which hepatitis A is endemic, e.g. Iran, immunoglobulin prophylaxis is enough, and mass

vaccination seems unnecessary. Gendrel *et al.* have previously reported similar results (9-11).

Hirota *et al.* (14) recommend universal vaccination of the armed forces in low endemic areas; as we stated above our military soldiers were immune to hepatitis A and did not require universal vaccination against hepatitis A virus.

Conclusion

In light of our results, showing that 97.63% of the 800 army soldiers recruited in the study were immune to hepatitis A virus, vaccination for hepatitis A virus does not seem necessary for Iranian army draftees at his point in time. Needless to say, promoting hygiene can boost immunity against hepatitis A in our adult population.

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References

1. Who.int. Weekly Epidemiological Record 2000, 75:38-42. (<http://www.who.int/wer/pdf/2000/wer7505.pdf>.38-42).
2. Debord T, Buisson Y. Viral hepatitis of enteric origin. *Bull Soc Pathol Exot* 1998; **91**: 428-31.
3. Daniel L. Public health measures in the control of viral hepatitis: A World Health Organization perspective for the next millennium. *Gastr and Hep J* 2002; **17**: 452-53 .
4. Magdzik W. Hepatitis A in Poland in 2003. *Przegł Epidemiol* 2005; **59**: 289-95.
5. Franco E, Giambi C, Ialacci R, Coppola RC, Zanetti AR. Risk groups for hepatitis A virus infection. *Vaccine J* 2003; **21**: 2224-33.
6. Strader DB, Seeff LB. New hepatitis A vaccines and their role in prevention. *Drugs J* 1996; **51**: 359-66.
7. Papaevangelou G, Totos G, Roumeliotou A, Safary A. Brief report: hepatitis A vaccination in Greek military recruits. *J Med Virol* 1993; **40**: 1-4.
8. Hussain Z, Das BC, Husain SA, Murthy NS, Kar P. Increasing trend of acute hepatitis A in north India: Need for identification of high-risk population for vaccination. *J Gastroenterol Hepatol* 2006; **21**: 689-93.
9. Gendrel D, Launay O. Post-exposure vaccination against hepatitis A. *Therap J* 2005; **60**: 221-6.
10. Bryan JP, Nelson M. Testing for antibody to hepatitis A to decrease the cost of hepatitis A prophylaxis with immune globulin or hepatitis A vaccines. *Arch Intern Med* 1994; **154**: 663-8.
11. Prymula R, Beran J, Splino M. Analysis of prevention of an epidemic of viral hepatitis A in the Czech army 1970-1989. *Epidemiol Microbiol Immunol* 1994; **43**: 67-70.
12. Kitson MM, Connor MP. The requirement for hepatitis A vaccine in Gurkha soldiers. *J Army Med Corps* 1999; **145**: 84-5.
13. Victor JC, Surdina TY, Suleimenova SZ, Favorov MO, Bell BP, Monto AS. Person-to-person transmission of hepatitis A virus in an urban area of intermediate endemicity: implications for vaccination strategies. *Am J Epidemiol* 2006; **163**: 204-10.
14. Bader TF. Hepatitis A vaccine. *Am J Gastroenterol* 1996; **91**: 217-22.
15. Buma AH, Beutels P, van Damme P, Tormans G, van Doorslaer E, Leentvaar-Kuijpers A. An economic evaluation of hepatitis A vaccination in Dutch military soldiers. *Mil Med* 1998; **163**: 564-7.
16. Hirota WK, Duncan MB, Hirota WK, Tsuchida A. The utility of prescreening for hepatitis A in military recruits prior to vaccination. *Mil Med* 2002; **167**: 907-10.
17. Steffen R. Changing travel-related global epidemiology of hepatitis A. *Am J Med* 2005; **118**: 46-9.
18. Laurichesse H, Peigue-Lafeuille H, Gibert R, Fuchs F, Beytout J, Rey M. Risk of Hepatitis A Infection among Young Travelers to Developing Countries: The Need for Vaccination. *J Travel Med* 1997; **4**: 195-6.
19. Arvanitidou M, Mamassi P, Vayona A. Epidemiological evidence for vaccinating wastewater treatment plant workers against hepatitis A and hepatitis B virus. *Eur J Epidemiol* 2004; **19**: 259-62.
20. De Silva KS, Weerasuriya DC, Peelawattage M, Fernando S. Seroprevalence of hepatitis A antibodies in relation to social factors--a preliminary study. *Ceylon Med J* 2005; **50**: 54-8.
21. Keffe EB. Occupational risk for hepatitis A: a literature-based analysis. *J Clin Gastroenterol* 2004; **38**: 440-8.
22. Grzeszczuk A, Sokolewicz-Bobrowska E, Chlabicz S. Occupational risk of hepatitis A infection among health care providers in northeastern Poland. *Med Sci Monit* 2003; **9**: 11-4.
23. Almeida D, Tavares-Neto J, Queiroz-Andrade M, Dias C, Ribeiro T, Silva F, *et al.* Sociodemographical aspects of seroprevalence of hepatitis A virus in the settlement of Cavunge, a semi-arid region of Bahia State. *Rev Soc Bras Med Trop* 2006; **39**: 76-8.
24. Makvandi M, Shamsizadeh A, Bagheri N, Latifi M. Prevalence of Hepatitis A virus in patients with acute Hepatitis at Aboozar Hospital of Ahwaz in 1376. *Feyz Med J* 1378; **12**: 54-8.
25. Nassrolahei M, Khalilian A. Seropositivity of antibodies against *Helicobacter pylori* and hepatitis A virus in Iran. *Ann Saudi Med* 2004; **24**: 61-4.
26. Salehi M, Sanei ME, Soheilla K. Etiology of acute viral hepatitis in Zahedan. *Pajooresh dar Pezeshki* 1381; **29**: 245-8.
27. Mehr AJ, Ardakani MJ, Hedayati M, Shahrz S, Mehr EJ, Zali MR. Age-specific seroprevalence of hepatitis A infection among children visited in pediatric hospitals of Tehran, Iran. *Eur J Epidemiol* 2004; **19**: 275-8.
28. Lankarani MM, Alavian SM, Manzoori H. Antibodies against hepatitis A in HBV carriers. *Govaresh* 1383; **9**: 237-41.