ORIGINAL RESEARCH

Stephen G. Wong¹ MD
Richard Pollock¹ LLB
Gerald Y. Minuk¹ MD

¹Section of Hepatology, Health Sciences Centre, University of Manitoba, Winnipeg, Canada.

Prevalence of Liver Disease and Utilization of a Hepatology Consultation Service at an Urban Tertiary Care Hospital

Abstract

Purpose: The prevalence of liver disease and frequency of consultations to a Hepatology Consultation service for patients with liver enzyme/function abnormalities admitted to a clinical teaching unit at an urban tertiary care hospital have not been previously described. To document these data, a retrospective chart review of adult patients admitted for non-hepatobiliary problems to a general Internal Medicine clinical teaching unit at an urban, tertiary care hospital during a three month period was performed.

Methods: Laboratory test results were reviewed to determine if liver enzymes and function tests had been ordered during the first five days of admission and, in those with abnormal results, whether referrals had been sent to the hospital's Hepatology Consultation service for further investigations and/or management.

Results: A total of 506 admissions occurred during the study period. Of these, 452 (89%) were for patients with no known liver disease. Liver biochemistry testing was obtained in 218 (48.2%) of these individuals. In 192 (88.1%), liver enzyme or function tests were abnormal and in 91 (41.7%), both enzymes and function tests were abnormal (suggesting more advanced disease). Referrals to the Hepatology Consultation service were requested for 5/91 (5.5%) patients with more advanced disease and none with only liver enzyme or function tests abnormalities.

Conclusions: Although liver enzymes and/or function test abnormalities are common in this patient population, screening for liver disease is relatively uncommon and consultation to a Hepatology Consultation service occurs in less than 10% of cases.

Manuscript submitted 29th August, 2015
Manuscript accepted 9th October, 2015

Clin Invest Med 2015; 38 (6): E358-E361.

Correspondence to:
Dr. G.Y. Minuk
Morberg Family Chair in Hepatology
University of Manitoba
John Buhler Research Centre
715 McDermot Ave.
Winnipeg, MB R3E 3P4
E-mail: Gerald.Minuk@umanitoba.ca

The prevalences of obesity, viral hepatitis and drug-induced liver injury are largely responsible for an estimated 10-20% of the general population having biochemical evidence of acute or chronic liver disease [1-3]. These high and increasing prevalence rates underscore the importance of developing and utilizing Hepatology as a subspecialty committed to providing a better understanding and quality of care for patients with hepatobiliary disorders. Indeed, utilization of such expertise has been documented in patients with decompensated cirrhosis and resulted in significant decreases in lengths of hospital stay, costs of hospitalization, incidences of readmission and improved survival for liver disease patients [4].

Biochemical evidence of liver disease is often sought by documenting serum aminotransferase and cholestatic liver enzyme levels as well as tests of liver function such as serum albumin levels, bilirubin levels and international normalized ratio for prothrombin times (INR). In general, patients with enzyme and functional abnormalities are considered to have more advanced disease than those with enzyme abnormalities alone [5].

Despite the high prevalence, adverse outcomes and documented value of Hepatology consultations, there have been no reports describing rates of screening, prevalence of liver disease and utilization of Hepatology Consultation Services in patients admitted to general medical wards at urban, tertiary care teaching hospitals.

Methods

The medical records of adult patients admitted to a clinical teaching unit at an urban tertiary care hospital in Winnipeg, Manitoba, Canada with non-hepatobiliary problems over a three month period (May–July, 2012) were reviewed to determine what percent of patients had liver enzymes and/or function tests performed within five days of admission and, in those with abnormal results, what percent of those individuals were referred to the hospital's Hepatology Consultation Service.

For the purpose of this study, liver enzyme tests included serum alanine aminotransferase and aspartate aminotransferase levels, alkaline phosphatase and/or gamma-glutamyl transferase levels and function tests; serum albumin levels, bilirubin levels and INR. Patients were considered to have been screened for and diagnosed with liver disease if a minimum of two liver enzyme or function tests had been ordered and found to be abnormal.

Patients were divided into two cohorts: 1) those not known to have liver disease; and, 2) those previously diagnosed with liver disease.

Results

A total of 506 admissions to the clinical teaching unit occurred during the three month study period. Of these, 452 (89%) were for patients not known to have liver disease and 54 (11%) those with known liver disease.

Patients not known to have liver disease

Of the 452 patients without known liver disease, 218 (48.2%) had liver biochemistry testing performed within five days of admission. Of these 218 patients, 192 (88.1%) had abnormal liver enzymes and/or function tests. Ninety-one patients (41.7%) had both abnormal liver enzyme and function tests, 64 (29.4%) only abnormal liver enzyme levels and 37 (17%) only abnormal liver function tests (Figure 1).

Five of the 91 patients (5.5%) with both liver enzyme and function test abnormalities were referred to the hospital's Hepatology Consultation Service for further investigations and/or management. Patients with abnormal liver enzyme or function tests alone were not referred for consultation.

Patients with previously known liver disease

Of the 54 subjects with previously diagnosed liver disease, all had liver enzyme and/or function tests performed and, in each case, abnormalities of both were detected. Of these individuals, 16 (29.6%) were referred to the hospital's Hepatology Consultation Service for further investigations and/or management.

Discussion

The prevalence of liver enzyme abnormalities in the general population is estimated to be approximately 10-20% and is increasing as obesity and associated non-alcoholic fatty liver disease (NAFLD) becomes more prevalent [1-3,6]. Proposed screening of "baby boomers" for evidence of chronic hepatitis C infections is expected to further increase the documented prevalence of liver disease in the general population as is immigration of individuals from areas of the world where hepatitis B and C infections are endemic [7,8]. In the present study, 155/218 (71%) of hospitalized patients without a history of liver disease who were screened for liver enzyme abnormalities, were found to have abnormal results on admission to hospital. This figure is significantly higher than that predicted based on general population figures and likely reflects the comorbidities commonly seen in patients requiring hospitalization to general medical wards: predominantly ischemic heart disease; strokes; diabetes; and, infections, all of which are associated with risk

FIGURE 1. Results of liver biochemistry testing in 218 patients with no history of liver disease admitted to a general medical ward for non-hepatic disorders. LE and LFT refer to liver enzyme and function tests, respectively.

factors for fatty infiltration of the liver and/or ischemic liver injury.

Reasons why the hospital's Hepatology Consultation Service was not utilized more often in patients with newly diagnosed liver enzyme/function abnormalities remain to be determined. Presumably, priority was given to the non-hepatic causes for hospitalization. The perception that liver biochemical abnormalities are common and often transient with many of these conditions (myocardial infarctions, heart failure and sepsis) might have also contributed to this finding. In addition, there is perhaps a general lack of awareness that effective therapies are available for most hepatobiliary disorders. During the three month study period, attendings on the Hepatology Consultation Service changed on a total of six occasions (every two weeks) and, therefore, inadequate or perceived inadequate teaching/feedback by Hepatology attendings to the hospital ward staff is unlikely to have been an important contributing factor.

Not surprisingly, 100% of individuals with known liver disease had biochemical confirmation of their disorder. Somewhat surprising was the relatively few consultations to the Hepatology Consultation Service for further investigations and management of these patients. Although the explanation for this finding is likely similar to that responsible for the low consultation rates documented in patients with newly diagnosed

liver disease (low priority, common and often transient nature of the biochemical abnormalities and perceived therapeutic futility), there may also be a perception that these patients are already being managed adequately for their liver disorder.

There are number of limitations to this study that warrant emphasis. First, the patient demographics and principle causes for admission to the teaching unit were not documented. The latter omission is particularly problematic in that knowing the underlying diagnosis might have helped to explain the relatively low referral rates. That said, given that some of these conditions, such as heart failure and sepsis, can result in significant liver disease and/or failure in their own right, particularly in patients with underlying liver disease, consultation to the Hepatology Consult Service might have still been worthwhile [9-11]. Second, it could not be determined whether liver disease testing was initiated by students, ward residents or attending physicians and who was responsible for initiating referrals to the Hepatology Consultation Service. Third, in some instances the abnormal liver enzymes or function tests may have reflected non-hepatobiliary causes such as skeletal muscle disease, bone disorders and hemolysis. Fourth, the underlying cause of the liver disease responsible for the liver enzyme/function abnormalities was not documented. Fifth, liver enzyme and function tests are not inevitably abnormal in patients with liver disease and, therefore, the results of liver imaging/

elastography would have been of interest. In the absence of such data it is difficult to extrapolate the study's conclusions to the general population. Finally, it is conceivable that some patients were referred to other specialties such as Gastroenterology, Infectious Diseases or Surgery for further investigations and/or management of their liver disorder.

Conclusions

Overall, the results of this study indicate that approximately one half of adult patients admitted to this clinical teaching unit in an urban tertiary care hospital undergo testing for biochemical evidence of liver disease and, in a large majority of these patients, abnormalities are detected. The results also suggest that Hepatology Consultation Services are infrequently utilized. Based on these findings, further research and education regarding the prevalence of liver disease in hospitalized patients and benefits of Hepatology consultations are warranted.

Acknowledgements

The authors wish to thank Ms R. Vizniak for her prompt and accurate typing of the manuscript.

References

1. Bellentani S, Tiribelli C, Saccoccio G, Sodde M, Fratti N, De Martin C, Cristianini G. Prevalence of chronic liver disease in the general population of northern Italy: the Dionysos Study. *Hepatology*. 1994 Dec;20(6):1442-9.
2. Ruhl CE, Everhart JE. Elevated serum alanine aminotransferase and gamma-glutamyltransferase and mortality in the United States population. *Gastroenterology*. 2009 Feb;136(2):477-85.
3. Lee TH, Kim WR, Benson JT, Therneau TM, Melton LJ 3rd. Serum aminotransferase activity and mortality risk in a United States community. *Hepatology*. 2008 Mar;47(3):880-7.
4. Bini EJ, Weinschel EH, Generoso R, Salman L, Dahr G, Pena-Sing I, Komorowski T. Impact of gastroenterology consultation on the outcomes of patients admitted to the hospital with decompensated cirrhosis. *Hepatology*. 2001 Dec;34(6):1089-95.
5. Minuk GY. Canadian Association of Gastroenterology Practice Guidelines: evaluation of abnormal liver enzyme tests. *Can J Gastroenterol*. 1998 Sep;12(6):417-21.
6. Ford ES, Giles WH, Mokdad AH. Increasing prevalence of the metabolic syndrome among U.S. Adults. *Diabetes Care*. 2004 Oct;27(10):2444-9.
7. Smith BD, Morgan RL, Beckett GA, Falck-Ytter Y, Holtzman D, Teo CG, Jewett A, Baack B et al. Recommendations for the identification of chronic hepatitis C virus infection among persons born during 1945-1965. *MMWR Recomm Rep*. 2012 Aug 17;61(RR-4):1032.
8. Fabris P, Baldo V, Baldovin T, Bellotto E, Rassu M, Trivello R, Tramarin A et al. Changing epidemiology of HCV and HBV infections in Northern Italy: a survey in the general population. *J Clin Gastroenterol*. 2008 May-Jun;42(5):527-32.
9. Moller S, Bernardi M. Interactions of the heart and the liver. *Eur Heart J*. 2013 Sep;34(36):2804-11.
10. Nessler N, Launey Y, Aninat C, Morel F, Malledant Y, Sequin P. Clinical review: The liver in sepsis. *Crit Care*. 2012 Oct 30;16(5):235.
11. Asrani SK, O'Leary JG. Acute-on-chronic liver failure. *Clin Liver Dis*. 2014 Aug;18(3):561-74.