Patterns of GI Specialty Referral for Primary Care Patients with Nonalcoholic Fatty Liver Disease

John F. G. Bobo MD, Brad A. Keith MD, Andrew D. Schreiner MD, MSCR
Department of Internal Medicine, Medical University of South Carolina, Charleston, SC, USA

Introduction

Non-alcoholic fatty liver disease (NAFLD) is a spectrum of disease characterized by hepatic steatosis in the absence of excessive alcohol use.

NAFLD is the most common cause of chronic liver disease in the United States as well as the world. Its overall prevalence in the U.S. is estimated to be 1 in 4 Americans.[1]

NAFLD related morbidity includes advanced fibrosis, cirrhosis, hepatocellular carcinoma (HCC), and liver decompensation. The majority of patients with NAFLD are followed in the primary care setting.

Many primary care providers (PCP) perceive NAFLD as an important health problem but cite lack of confidence in understanding the disease as a significant barrier in management. Although NAFLD can be sufficiently managed in the primary care setting, there is evidence PCPs rarely consider GI referral for patients with NAFLD.[2]

This opens up the potential for underutilization of GI referral when specialist intervention would be warranted for cases of untreated HCC, advanced fibrosis, and cirrhosis.

Aims

We performed a retrospective chart review of 652 patients treated in primary care clinics at our institution with image-verified evidence of hepatic steatosis who had no other competing liver disease. In patients referred to GI, we reviewed referral orders for the reason of referral, and compared severity of fibrosis between referred and non-referred patients using Fibrosis-4 Index (FIB-4) scores.

Primary aims:

- Quantify the proportion of GI referral in primary care patients with NAFLD-related hepatic steatosis.
- Identify the most common reasons for GI referral in this patient population.
- Determine if high-risk FIB-4 scores correlated with likelihood of referral

Methods

This was a review of electronic health record data from 2012 to 2018 including primary care patients with (i) radiographic reports of liver steatosis identified by natural language processing (abdominal ultrasound, CT, or MRI) and (ii) no competing, non-NAFLD chronic liver disease diagnoses.[3] Patients with hepatic steatosis and inputs for FIB-4 calculation within 1 year of imaging were included. Referral to gastroenterology or hepatology (GI) any time after imaging was the primary outcome. Chart review was conducted to determine if a patient was referred, the reason for the referral, and whether the patient attended the specialty visit prior to the end of the study period. Other variables included demographic, lab, and chart review data. Comorbidity data came from Elixhauser coding algorithms.[4] Fibrosis-4 Index (FIB-4) scores were calculated and categorized by advanced fibrosis risk.[5,6]

Patient characteristics were reported overall and by GI specialty referral. Continuous variables were reported as means and compared with Student t-tests and categorical variables were reported as proportions and compared with Chi-square tests. Statistical analyses were performed using SAS version 9.4. The IRB at the Medical University of South Carolina approved this study.

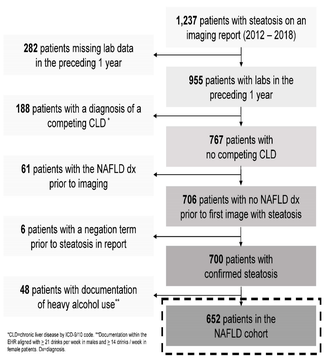

Fig. 1. Primary care NAFLD cohort diagram

Demographics	
Age, Mean, years (SD)	54.7 (± 14.1)
Gender % (n)	
Male	35.9% (234)
Female	64.1% (418)
Race % (n)	
Black	35.9% (234)
Non-Black	64.1% (418)
Clinical Variables, Median (IQR)	
BMI ≥ 30 kg/m² % (n)	73.3% (478)
Bili, mg/dL	0.5 (0.4, 0.8)
AST, U/L	26 (20, 39)
ALT, U/L	28 (19, 49)
ALP, U/L	82 (66, 105)
Platelets, x10⁹/L	241 (200, 293)
Albumin g/dL	3.7 (3.4, 4.0)
Liver Chemistry Abnormality % (n)	
Elevated AST	31.9% (208)
Elevated ALT	28.7% (187)
Elevated AST or ALT	37.6% (245)
Elevated AST and ALT	23.0% (150)
Comorbidities % (n)	
Diabetes	46.0% (300)
Hypertension	77.8% (507)
Hyperlipidemia	67.8% (442)
Other Diagnostic Variables	
Where Steatosis Reported % (n)	
Findings only	20.6% (134)
Impression	79.5% (518)
Negative HBV Testing % (n)	35.3% (230)
Negative HCV Testing % (n)	46.2% (301)
Alcohol Use History % (n)	
Yes, below threshold[a]	37.9% (247)
None	52.6% (343)
Not recorded	9.5% (62)
Advanced Fibrosis Risk Assessments	
High-risk FIB-4 % (n)	11.5% (75)
High-risk NFS % (n)	17.9% (117)

Table 1. NAFLD cohort characteristics

Results

The cohort included 652 patients with a mean age of 54.7 (SD ± 14.1) years and a mean BMI of 33.4 (SD ± 8.2) kg/m2. Of included patients, 64.1% (418) were female and 35.9% (234) identified as Black. Of the cohort, 46.0% (300) had diabetes, 77.8% (507) had hypertension, and 67.8% (442) were diagnosed with hyperlipidemia. One in four patients (164) received a formal diagnosis of NAFLD. FIB-4 scores were high-risk for advanced fibrosis (>2.67) in 11.5% (75) of patients, indeterminate-risk (1.3 - 2.66) for 31.1% (203) of patients, and low-risk (< 1.3) for 57.4% (374) of the sample.

Overall, 45.7% (298) of patients received a referral to GI, with 32.4% (95) of these referrals being for colonoscopy. Of referred patients, only 10% (30) were referred for either steatosis or NAFLD. Of patients referred for reasons other than colonoscopy, 75.4% (153) of patients attended the appointment. Univariate analyses demonstrated similar demographic and comorbidity variables between patients with and without a GI referral, save for patients referred to GI had higher proportions of diabetes (p<0.03) and hyperlipidemia (p<0.04) than those not referred. There was no difference in the proportion of high-risk FIB-4 scores between patients with and without a GI referral (p=0.95). A higher proportion of referred patients (32.9%) received a diagnosis of NAFLD during the study period compared to those not referred (18.6%, p<0.001).

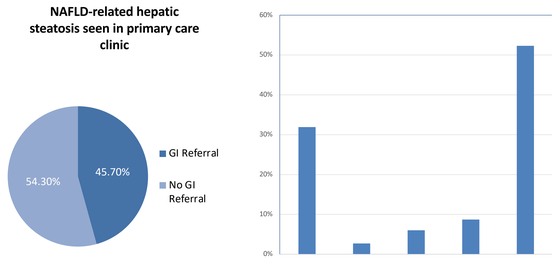

Chart 1. Proportion of GI referral

Chart 2. Reason for referral

Discussion

The spectrum of NAFLD ranges from hepatic steatosis alone to the more severe end of the spectrum where nonalcoholic steatohepatitis (NASH) exists. NASH is defined as hepatic steatosis associated with inflammation and hepatocellular ballooning, which can progress to worsening fibrosis, and ultimately cirrhosis. In fact, NASH is predicted to be the leading indication for liver transplantation within the next 10 years.[7] NAFLD generally can be managed in the primary care setting. Thus exhaustive use of GI referral for NAFLD management is a theoretical concern. However, our data suggests hepatic steatosis is infrequently recognized as a notable finding on abdominal imaging and did not prompt excessive GI referral—45.7% of our patients with hepatic steatosis were referred to GI, 90% of these referrals for reasons unrelated to NAFLD or steatosis. Severity of fibrosis, represented by FIB-4 Index, did not influence referral likelihood in this cohort.

Conclusions

NAFLD often can be sufficiently managed in the primary care setting. However specialist intervention for patients with significant fibrosis from NAFLD is important in preventing NAFLD-related morbidity and mortality. What our data and a broader review of the literature suggests is that there are barriers to getting the most at risk NAFLD patients to GI for management.

A major barrier to GI referral is lack of clear guidelines for NAFLD screening and what to do with incidental hepatic steatosis found on imaging. PCPs acknowledge lack of confidence in management of NAFLD, often do not consider GI referral for hepatic steatosis, and lack clear guidance on how to identify patients at high risk for advanced fibrosis. Our findings highlight the need for validated pathways to guide PCPs in discovering patients at increased risk for advanced fibrosis who would need GI follow up.

Contact

John Bobo
Medical University of South Carolina
Email: boboj@musc.edu
Phone: (843) 412-9403

References

1. Arshad T, Golabi P, Henry L, Younossi ZM. Epidemiology of Non-alcoholic Fatty Liver Disease in North America. Curr Pharm Des. 2020;26(10):993-997. doi: 10.2174/1381612826666200303114934. PMID: 32124690.
2. Said A, Gagovic V, Malecki K, Givens ML, Nieto FJ. Primary care practitioners survey of non-alcoholic fatty liver disease. Ann Hepatol. 2013 Sep-Oct;12(5):758-65. PMID: 24018493.
3. Nielsen EM, Anderson KP, Marsden J, Zhang J, Schreiner AD. Nonalcoholic Fatty Liver Disease Underdiagnosis in Primary Care: What Are We Missing? J Gen Intern Med. 2021; PubMed PMID: 34816326.
4. Quan H, Li B, Saunders LD, et al. Assessing validity of ICD-9-CM and ICD-10 administrative data in recording clinical conditions in a unique dually coded database. Health Serv Res. 2008;43(4):1424-1441; PubMed PMID: 18756617; PMCID: PMC2517283.
5. McPherson S, Stewart SF, Henderson E, Burt AD, Day CP. Simple non-invasive fibrosis scoring systems can reliably exclude advanced fibrosis in patients with non-alcoholic fatty liver disease. Gut. 2010;59(9):1265-1269; PubMed PMID: 20801772.
6. Shah AG, Lydecker A, Murray K, et al. Comparison of noninvasive markers of fibrosis in patients with nonalcoholic fatty liver disease. Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association. 2009;7(10):1104-1112; PubMed PMID: 19523535; PMCID: PMC3079239.
7. Wong RJ, Aguilar M, Cheung R, Perumpail RB, Harrison SA, Younossi ZM, Ahmed A. Nonalcoholic steatohepatitis is the second leading etiology of liver disease among adults awaiting liver transplantation in the United States. Gastroenterology. 2015 Mar;148(3):547-55. doi: 10.1053/j.gastro.2014.11.039. Epub 2014 Nov 25. PMID: 25461851.

© Poster Template by Genigraphics® 1.800.790.4001 www.genigraphics.com