VALUE IN HEALTH REGIONAL ISSUES 6C (2015) 132–140

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/vhri

Inpatient Treatment Patterns and Health Care Expenditures for Hepatocellular Carcinoma among the Population with Urban Basic Health Insurance in China

Fen Du, MS[1], Diana Chirovsky, PhD[2,], Xian Jun Xiong, MS[3], Jing Hu Li, MS[3], You Lin Qiao, MD[4], Yan-Jun Zhang, MS[5], Jie Zhang, PhD[3]*

[1]*Beijing Brainpower Pharma Consulting Co., Beijing, China;* [2]*Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA;* [3]*China Health Insurance Research Association, Beijing, China;* [4]*National Cancer Center, Cancer Hospital, Chinese Academy of Medical Sciences, Beijing, China;* [5]*Health Economics and Outcomes Research, Market Access, Sino-American Shanghai Squibb Pharmaceuticals Ltd., Shanghai, China*

ABSTRACT

Objective: To identify inpatient treatment patterns and health care expenditures for hepatocellular carcinoma (HCC) among the population with urban basic health insurance (BHI) in China. **Methods:** Hospitalizations for patients 18 years or older with discharge diagnosis of HCC from 2008 to 2011 and enrolled in the Chinese BHI plan were identified from the Chinese Health Insurance Research Association database. Treatment approaches and hospital expenditures were assessed for the full sample, and according to city level and hospital tier. Analyses were extrapolated to the national urban BHI population. **Results:** A total of 3679 HCC hospitalizations were identified in the period 2008 to 2011, representing 615,359 hospitalizations among the urban BHI population. More than two-thirds of the patients received active treatment during hospitalization (68%, N = 418,394), most commonly with traditional Chinese medicine (51%) and/or transarterial intervention therapy (21%). Cases from larger level 1 cities and larger tier 3 hospitals reported greater use of active treatments (81% and 83%, respectively) than did those from smaller level 3 cities (46%) or tier 1 hospitals (56%). Hospital expenditures were higher in level 1 cities (mean [95% confidence interval] Chinese currency renminbi [¥] 17,119 [¥16,292–¥17,946]; US $2,506 [$2,385–$2,628]) than in level 3 cities (mean [95% confidence interval] ¥7,870 [¥5,775–¥9,964]; $1,152 [$846–$1,459]). **Conclusions:** Most patients with HCC received active treatment during hospitalization in China. There were substantial disparities, however, in the use of HCC treatments across different economic regions, and nearly a third received only palliative care. With the recent launch of health care reform, this study provides valuable insights into current resource use and costs for HCC in China to help prioritize areas of improvement.

Keywords: basic health insurance, China, cost, health care expenditures, hepatocellular carcinoma, treatment.

Introduction

Hepatocellular carcinoma (HCC) is one of the most prevalent and deadly cancers worldwide [1,2]. It is particularly common in Asian-Pacific countries, resulting from a higher prevalence of hepatitis B virus infection, and more than half of all global cases occur in China alone [3]. In China, HCC is the third most frequent cancer and the second leading cause of cancer-related death; an estimated 402,000 new cases were diagnosed and 372,000 HCC-related deaths occurred in 2008 [1]. HCC presents a significant economic and societal burden in China, and it is the highest contributing factor to hospital expenditures related to hepatitis B virus infection [4–7].

In recent years, the China Ministry of Health has declared HCC as one of five tumors of high national importance and has published its newest Diagnosis and Treatment Guidelines for Primary Liver Cancers (2011 edition) [8]. Largely consistent with consensus recommendations published by other developed nations [9–11], guideline-recommended therapeutic options for HCC are administered on the basis of tumor stage and liver function [8]. Patients with HCC diagnosed at an early stage are eligible for curative surgical therapies, which include liver resection and liver transplantation, and, in some cases, receive local ablation therapy. Most of the patients, however, are diagnosed with intermediate to advanced HCC for which curative treatment

Conflict of interest: Bristol-Myers Squibb, Inc. (BMS), funded the analyses for this project. Diana Chirovsky is a doctoral student at the University of North Carolina at Chapel Hill and has received a predoctoral fellowship grant from BMS. Yan-Jun Zhang is now an employee at Novartis Group (China), Beijing, China.

* *Address correspondence to:* Diana Chirovsky, Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, 135 Dauer Drive, 1101 McGavran-Greenberg Hall, CB 7411, Chapel Hill, NC 27599.

E-mail: chirovsky@unc.edu.

2212-1099$36.00 – see front matter Copyright © 2015, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

http://dx.doi.org/10.1016/j.vhri.2015.03.009

is not an option [12]. For intermediate to advanced HCC, treatment options include palliative resection, local treatments, such as local ablation and transarterial intervention therapy, radiotherapy, systemic therapy, and palliative care [8]. Recommended systemic therapies include molecular targeted therapy, systemic chemotherapy, as well as traditional Chinese medicine (TCM).

Although multiple treatment options are available, little is known about current treatment approaches and associated costs for HCC at the national level in China [12–14]. A better understanding of current treatment patterns and expenditures for HCC using real-world data in China can help guide interventions to increase compliance with clinical guideline recommendations and minimize health care costs. Therefore, the objective of this study was to identify inpatient treatment patterns and health care expenditures for HCC among the population with urban basic health insurance (BHI) in China. As secondary objectives, the study also explored differences in treatment patterns and associated HCC-related expenditures according to city-level size and hospital type.

The urban BHI plan is required by the government and currently covers more than 90% of China's population in urban areas nationwide [15]. The urban population in China represents approximately 51% of the total population in China [16]. Knowledge of HCC treatment patterns and costs among the urban population can help identify current areas of unmet medical need across different economic regions and inform current health care reform efforts to improve long-term outcomes for this patient population in China.

Methods

Study Subjects

Eighteen years or older inpatients with a discharge diagnosis of HCC from 2008 to 2011 were identified from the Chinese Health Insurance Research Association (CHIRA) database. CHIRA conducts a national survey of health care services utilization and costs for hospitalizations among urban BHI inpatients annually. For each hospitalization, the integrated database includes information on hospital-level characteristics, patients' demographic characteristics, health insurance type, and inpatient diagnoses, procedures, and expenses.

Hospitalizations are selected annually from approximately 60 local health insurance departments using multistage stratified sampling in terms of geographic location (East, Central, and West; excluding Hong Kong, Taiwan, and Macau), city level (levels 1–3), and hospital tier (tiers 1–3). Level 1 cities are defined as provincial capitals (e.g., Guangzhou, Hangzhou, Nanjing, and Wuhan) and municipalities (i.e., Beijing, Chongqing, Shanghai, and Tianjin), level 2 includes prefecture- (e.g., Baoding and Weihai) and sub–prefecture-level cities (e.g., Jiyuan in Henan), and level 3 includes the less heavily populated county-level cities (e.g., Yiwu in Zhejiang). Tier 1 hospitals indicate small community hospitals, tier 2 intermediate volume hospitals, and tier 3 large/academic hospital centers.

Data Collection

Study inclusion criteria included hospitalizations for individuals who were 1) 18 years or older, 2) enrolled in the Chinese urban resident or employee BHI plan, 3) were admitted to a hospital during the calendar years 2008 to 2011, and 4) had a diagnosis of HCC at patient discharge. HCC diagnosis was identified using the *International Classification of Diseases, Tenth Revision* codes: C22.0 (liver cell carcinoma) and C22.9 (liver, unspecified) [12].

HCC-related treatments were categorized into five categories on the basis of China Ministry of Health's Diagnosis and Treatment Guidelines for Primary Liver Cancers (2011 edition) [8]: surgical therapy, local therapy, radiotherapy, systemic therapy, and palliative therapy. Surgical therapies included liver resection and liver transplant. Local therapies included local ablation (radiofrequency ablation, microwave ablation, cryoablation, high-intensity focused ultrasound ablation, and percutaneous ethanol injection) and transarterial intervention therapy (transcatheter arterial infusion chemotherapy, transcatheter arterial embolization, and transarterial chemoembolization). Systemic therapies included molecular targeted therapy (sorafenib, sunitinib, bevacizumab, cetuximab, and erlotinib), systemic chemotherapy (most commonly doxorubucine, gemcitabine, cisplatin, oxaliplatin, capecitabine, fluorouracil, epirubicin, mitomycin C, carboplatin, lobaplatin, floxuridine, and thalidomide, among others), TCM (e.g., aidi injection, anduolin jiaonang, ankangxin-jiaonang, antike jiaonang, macao wessing particles, barbadian, corbrin capsule, shen lian capsule, and chansu injection), and other systemic therapies (interferon, thymosin α1, and interferon-α). Individuals who did not receive active treatment with any of the above therapies were categorized as having received palliative therapy. Palliative therapy was additionally verified on the basis of common palliative therapeutic regimens to treat HCC-related symptoms: narcotic analgesics, nonnarcotic analgesics, laxatives, antidiarrhea medications, antihistamines, antidepressants, anxiolytics, sedative/hypnotics, oxygen, and others.

To identify all inpatient therapies and procedures, the CHIRA database contains detailed charge lists for all hospital resources and related expenditures categorized by service type: diagnostic, medical device/supply, nursing care, surgical treatment, and medication. The above-mentioned HCC-related treatments were identified and characterized using a combination of records from the medication, medical device/supply, and surgical treatment charge lists. Medications for systemic therapies were mapped using the corresponding Anatomical Therapeutic Chemical Classification System codes for each generic name in cases in which systemic therapies were entered in text [15]. For most treatments, rather than providing the name of the procedure, the charge list showed only the device and agents used. Therefore, active treatments were categorized according to detailed device/agent lists (more than 50,000 items). Physician experts were then asked to verify the full list for each active treatment category.

Data Analysis and Extrapolation

Descriptive characteristics and treatment patterns for all hospitalizations with a discharge diagnosis of HCC were summarized using frequencies and percentages. Relevant characteristics included patients' demographic characteristics (sex, age, and insurance type), hospital level, city characteristics (city level and region), and year of hospitalization (2008–2011). Active and palliative treatment approaches were examined for the full study sample and according to city level and hospital tier.

Average inpatient hospital expenditures (in Chinese currency renminbi [¥]) and length of stay (in days) were calculated for all hospitalizations and across city level. Average hospital expenditures were further analyzed according to the above-mentioned active and palliative treatment categories. Additional analyses assessed average BHI reimbursement and cost-sharing for all hospital expenditures, defined as the ratio of costs for each BHI reimbursement category (BHI reimbursed, co-payment, and out-of- pocket costs for treatments ineligible for co-payment) over the total hospitalization cost for each event, according to year, city level, and insurance type.

Study analyses were extrapolated to reflect the national population with urban BHI. As exceptions, frequencies and