Special Contribution
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Impact of the 2024 medical-policy conflict on hepatocellular carcinoma management in Korea

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In 2024, a nationwide conflict between the South Korean government and the medical community, the medical-policy conflict, profoundly impacted healthcare delivery. This study aimed to evaluate the changes in the management of hepatocellular carcinoma (HCC) following this crisis. We analyzed retrospective real-world data from university hospitals in the Seoul Metropolitan Area, supplemented with national healthcare data from the Health Insurance Review and Assessment Service. The analytical variables included changes in workforce composition, initial treatment modalities, HCC stage distribution, quality indicators for HCC care, regional and institutional variations in care delivery, and liver transplantation (LT) volume. A comparison between 2023 and 2024 revealed a marked decline in the number of medical trainees, a rise in the proportion of physician assistants, a 28.9% reduction in newly initiated HCC treatments, and an increased rate of stage IV diagnoses. Several quality indicators, including rates of

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multidisciplinary care and patient education, declined. The volume of LTs decreased by approximately 20% nationwide, with some regions ceasing LT procedures. The results suggest that serious disruptions occurred in HCC care following the conflict. The significant decrease in initial treatment and number of LT procedures, more advanced stages at diagnosis, and declining quality metrics indicate the emergence of healthcare gaps. Without the recovery of the clinical workforce and the reestablishment of a stable healthcare delivery system, the management of serious diseases such as HCC will remain structurally vulnerable. National-level efforts are urgently required to address regional disparities and restore essential medical services. **(J Liver Cancer 2025;25:169-177)**

Keywords: Carcinoma, hepatocellular; Liver transplantation; Physician assistants; Policy

INTRODUCTION

Hepatocellular carcinoma (HCC) is the sixth most commonly diagnosed cancer and the third leading cause of cancer-related mortality worldwide.[1] In Korea, HCC ranks as the second most common cause of cancer death among men and the fourth overall, with a low survival rate and frequent delays in early detection.[2] HCC often develops in the context of chronic liver diseases, such as cirrhosis, and requires complex decision-making and multidisciplinary care, given its high disease burden and clinical complexity.[3] Therefore, optimal HCC management depends on a stable healthcare delivery system supported by skilled medical professionals. Delays in diagnosis or disruptions in treatment continuity can significantly affect patient outcomes.

In February 2024, a large-scale conflict between the South Korean government and the medical community was triggered by the government's proposal to increase the annual medical school admission quota to 2,000 students. This medical-policy conflict has led to the mass withdrawal of medical students and residents from their training hospitals, creating a substantial disruption in medical workforce availability. Attending physicians were forced to continue clinical care under severe staffing shortages. Changes were also observed in the roles and responsibilities of nursing staff and physician assistants (PAs), raising concerns regarding the quality and continuity of care. Although the public expressed anxiety over decreased access to timely diagnosis and treatment, objective data on how these disruptions have impacted clinical care, particularly for high-acuity diseases such as HCC, are lacking.

In August 2024, the Korean Society for Liver Transplantation reported a marked decline in liver transplantation (LT) activity. From March to June 2024, the number of living donor LTs decreased by 17-37% compared to the same period in the previous year, with a drop of more than 50% observed at Seoul National University Hospital. This has raised concerns about the potential deterioration in clinical outcomes and increased healthcare costs associated with delays in curative treatment for patients with HCC or cirrhosis.[4] Furthermore, in January 2025, local news reported that Pusan National University Hospital, one of the main regional referral centers for cancer care, was forced to suspend oncology services for gastrointestinal and thoracic malignancies including HCC because of the resignation or medical leave of three out of five board-certified medical oncologists.[5] In February 2025, administrative data from the Health Insurance Review and Assessment Service (HIRA) were cited by a member of the National Assembly to report that the number of surgeries for six major cancers performed at tertiary hospitals had decreased by approximately 20% compared to previous years. Among these, HCC surgery experienced the most marked decline, with a 24.7% year-on-year reduction.[6]

Despite these alarming trends, there remains a lack of quantitative data analyzing the impact of medical-policy conflicts on real-world HCC care. In response, the Korean Liver Cancer Association initiated a collaborative study using data from university hospitals in the Seoul Metropolitan Area, supplemented by national health insurance claims data. This study aimed to provide a comprehensive and objective overview of the shift in HCC care patterns following the 2024 medical-policy conflict.

METHODS

This study used two primary data sources. First, retrospective clinical data from eight university hospitals in the Seoul Metropolitan Area were collected to compare the HCC management patterns before and after the 2024 medical-policy conflict. The data encompassed three domains: 1) workforce composition, including the number and proportion of attending physicians, fellows, residents, and PAs, 2) initial treatment data, including the number of newly diagnosed patients with HCC per year, modified Union for International Cancer Control (mUICC) stage at

diagnosis,[7] and treatment modalities, and 3) quality of care indicators based on the national HCC quality assessment program. Workforce data were available from all eight hospitals, and initial treatment data were collected from seven institutions. Quality indicators were extracted for patients aged ≥18 years who were newly diagnosed with primary HCC after January 2023 and received surgical resection, systemic therapy, radiotherapy, transarterial chemoembolization (TACE), or transarterial radioembolization (TARE). The specific indicators included the following: 1) proportion of patients who received cancer education and counseling, 2) proportion of patients receiving multidisciplinary care, 3) rate of surgical treatment within 30 days of a confirmed diagnosis, 4) 30-day readmission rate after surgery, 5) postoperative mortality (death during hospitalization or within 90 days after surgery), and 6) rate of tumor surveillance testing (e.g., imaging and alpha-fetoprotein [AFP], protein induced by vitamin K absence or antagonist-II [PIVKA-II]) within 90 days after treatment. Quality data were available for four of the participating hospitals.

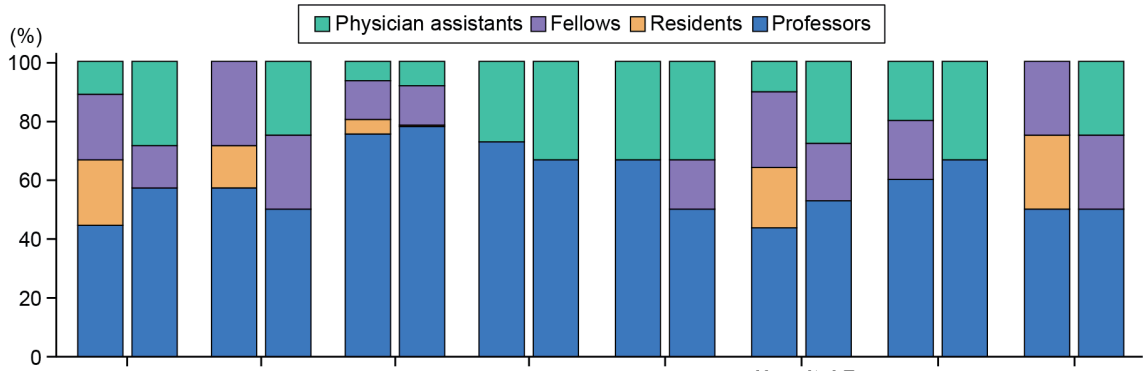
Second, to complement the institutional data and assess broader national trends, we utilized the Open Data System for Healthcare Big Data provided by the HIRA, accessible at https://opendata.hira.or.kr/home.do. This administrative claim dataset covers the period from January 2023 to July 2024. National-level indicators related to HCC and LT were analyzed, including the distribution of care by institution type and geographic region, average number of outpatient visits per patient per month, monthly volume of LT procedures, and regional LT rates. These data allowed for the assessment of changes beyond individual hospitals and facilitated the evaluation of national-level disparities in HCC care during the study period. This study did not involve collection of individual patient-level data from each institution but was based on aggregated institutional statistics and publicly available data from the HIRA. Therefore, it was exempt from Institutional Review Board (IRB) oversight. The exemption was approved by the Ajou University Hospital IRB (IRB No. AJOUIRB-EX-2025-379).

This study was submitted as a special consideration article based on an invited presentation delivered at the 2025 Korean Liver Cancer Association Annual Conference. Accordingly, the data collection and analysis were primarily descriptive, focusing on readily available institutional and open national datasets, rather than hypothesis-driven original research. Inferential statistical analyses were beyond the scope of this descriptive report.

RESULTS

Changes in workforce composition

Notable shifts were observed in the composition of the clinical staff responsible for HCC care between 2023 and 2024 among the eight participating university hospitals. By 2024, residents remained in only one hospital. In contrast, the proportion of PAs nearly doubled, increasing from 13.6% in 2023 to 26.8% in 2024. The proportion of attending faculty members increased slightly from 58.7% to 58.9%, with the absolute number increas-



	Hospital A		Hospital B		Hospital C		Hospital D		Hospital E		Hospital F		Hospital G		Hospital H	
	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
Physician assistants	11.1	28.6	0.0	25.0	6.6	8.3	27.3	33.3	33.3	33.3	10.3	27.8	20.0	33.3	0.0	25.0
Fellows	22.2	14.3	28.6	25.0	13.1	13.3	0.0	0.0	0.0	16.7	25.6	19.4	20.0	0.0	25.0	25.0
Residents	22.2	0.0	14.3	0.0	4.9	0.5	0.0	0.0	0.0	0.0	20.5	0.0	0.0	0.0	25.0	0.0
Professors	44.4	57.1	57.1	50.0	75.4	77.9	72.7	66.7	66.7	50.0	43.6	52.8	60.0	66.7	50.0	50.0

Figure 1. Change in workforce composition involved in the care of patients with HCC between 2023 and 2024. HCC, hepatocellular carcinoma.

ing modestly from 84 to 87 (Fig. 1).

Changes in initial treatment volume and modalities

An analysis of seven hospitals revealed that the number of patients receiving initial treatment for newly diagnosed HCC declined from 1,655 in 2023 to 1,177 in 2024, a 28.9% reduction. TACE and surgical resection were the most commonly used treatment modalities in both years. Although the proportions of patients who underwent resection and LT did not differ significantly, the use of TARE increased from 13.1% to 16.9%. In contrast, the use of local ablation therapy decreased from 13.3% to 9.6%. The stage distribution at the time of diagnosis has also shifted. The proportion of patients diagnosed at mUICC stages I and II showed a slight decline, whereas the proportion of patients diagnosed at stage IV increased from 9.8% in 2023 to 12.0% in 2024, indicating a trend toward more advanced disease at presentation (Fig. 2).

Stage-specific changes in initial treatment

Stage-specific analyses revealed shifts in the treatment strategies between 2023 and 2024. Among patients with mUICC stage I HCC, the most common initial therapies in 2023 were local ablation (34.8%) and surgical resection (29.1%). In 2024, local ablation (31.7%) and TACE (30.2%) were the predominant treatment modalities. For mUICC stage II HCC, surgical resection remained the most frequently performed treatment in both years (33.2% in 2023 and 37.1% in 2024), whereas the proportion of patients undergoing TACE decreased slightly (30.5% to 27.4%). In patients with mUICC stage III disease, both TACE and surgical resection were commonly employed. However, the use of TARE increased from 17.6% in 2023 to 23.9% in 2024, indicating the growing role of radioembolization in this subgroup. Systemic therapy and TARE are the most widely used treatments for mUICC stage IV HCC. Notably, the proportion of patients receiving systemic therapy increased markedly from 36.4% in

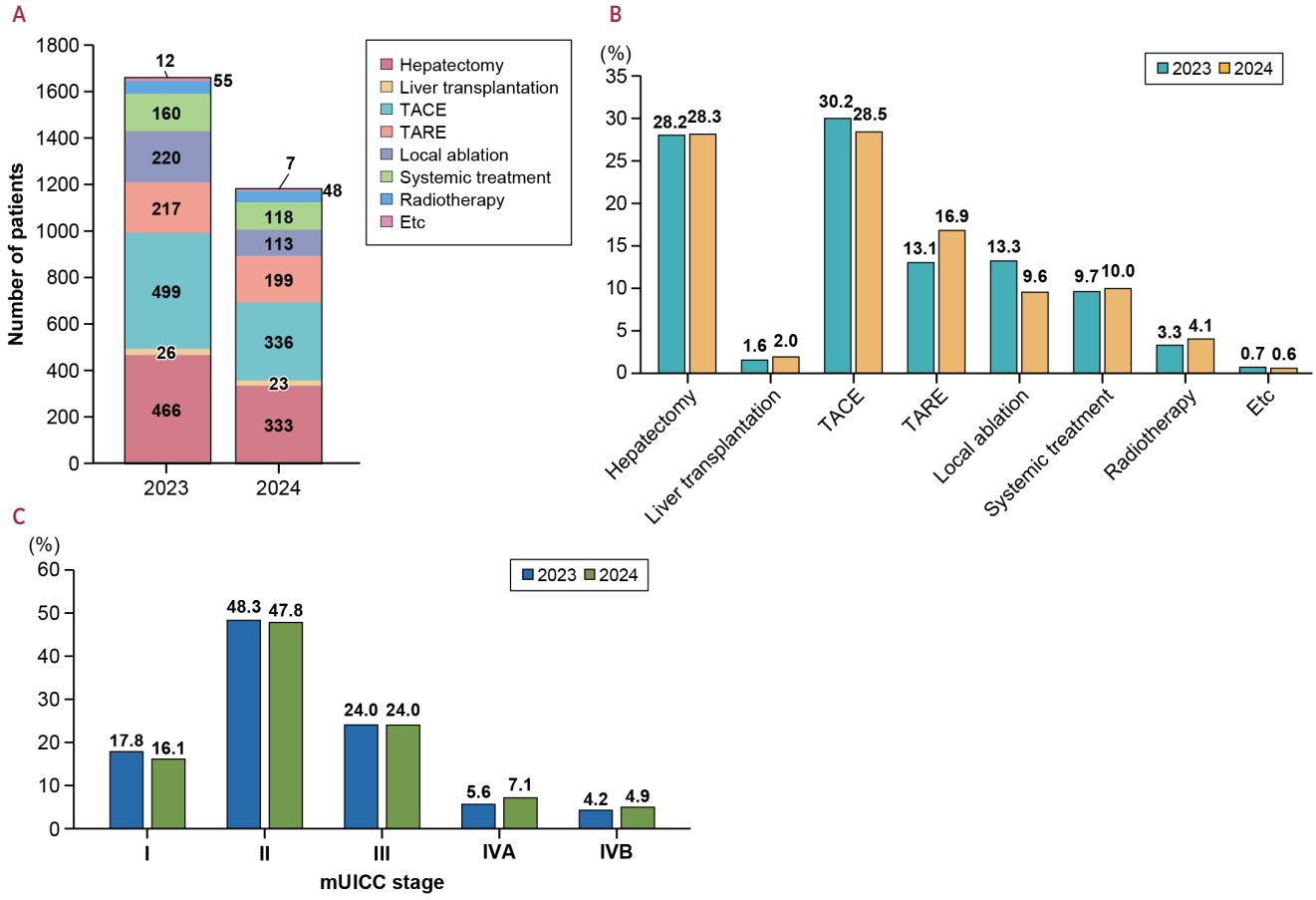


Figure 2. HCC patients newly diagnosed in 2023 and 2024. (A) Total number of cases. (B) Proportion by treatment modality. (C) Distribution by mUICC stage. TACE, transarterial chemoembolization; TARE, transarterial radioembolization; mUICC, modified Union for International Cancer Control; HCC, hepatocellular carcinoma.

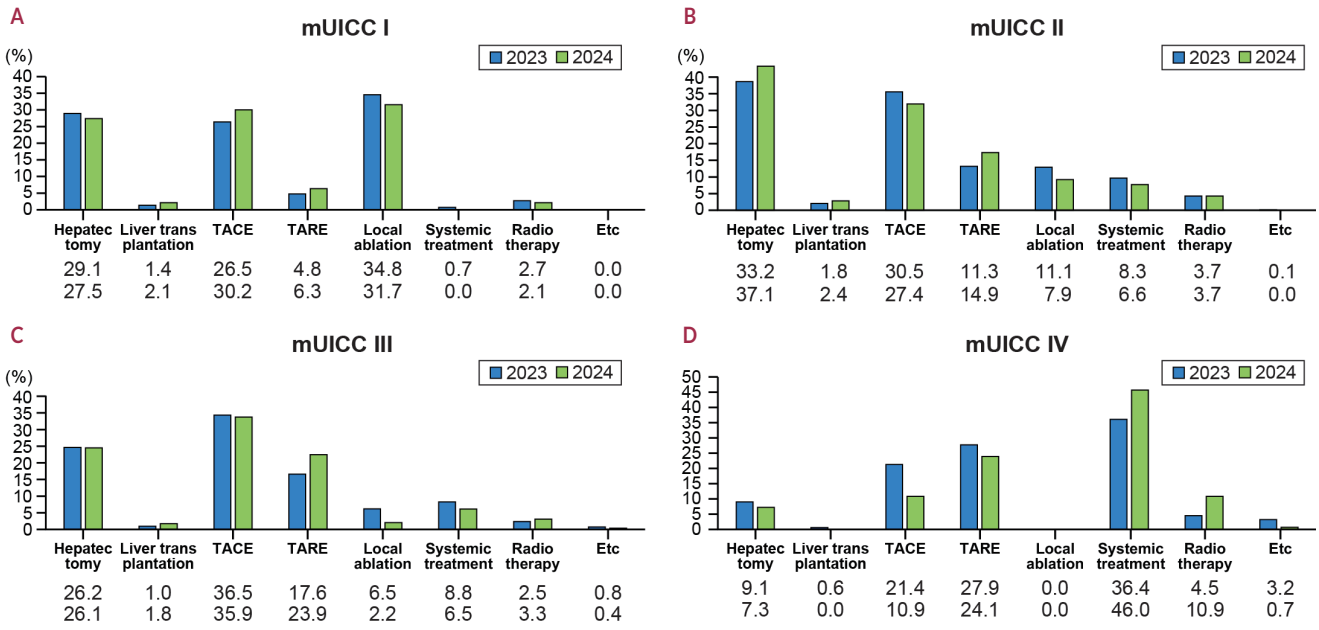


Figure 3. Changes in treatment modality by mUICC stage for HCC patients in 2023 and 2024. (A) Stage I. (B) Stage II. (C) Stage III. (D) Stage IV. mUICC, modified Union for International Cancer Control; TACE, transarterial chemoembolization; TARE, transarterial radioembolization; HCC, hepatocellular carcinoma.

2023 to 46.0% in 2024 (Fig. 3).

Changes in quality of care indicators

Six quality indicators were assessed using data from the four participating hospitals. The rate of patient education and counseling decreased from 79.6% in 2023 to 73.4% in 2024. The proportion of patients managed through multidisciplinary care showed a marked decline from 44.3% to 11.4%. The proportion of patients who underwent surgery within 30 days of the confirmed diagnosis remained relatively stable (66.2% in 2023 vs. 65.0% in 2024). The 30-day postoperative readmission rate increased from 0.6% to 10.5%, and the postoperative mortality rate (defined as death in-hospital or within 90 days of surgery) increased slightly from 0.0% to 1.3%. The proportion of patients who underwent tumor surveillance testing (imaging and AFP or PIVKA-II assays) within 90 days of treatment decreased from 93.5% in 2023 to 85.7% in 2024. These quality indicators showed variability across institutions (Fig. 4).

Facility and regional distribution of care and utilization frequency

An analysis of healthcare big data from the HIRA between January 2023 and July 2024 showed that most HCC care was delivered in tertiary hospitals, which accounted for more than 70% of all cases. General hospitals accounted for approximately 22-23%, and there was no significant change in institutional distribution before and after the medical-policy conflict. Regarding geographic distribution, approximately 50% of patients with HCC received care in Seoul, and approximately 70% in the greater Seoul Metropolitan Area. In contrast, several provinces, including Chungcheongbuk-do, Chungcheongnam-do, Gangwon-do, Gyeongsangbuk-do, and Jeju-do, each accounted for less than 2% of the cases. The average number of outpatient visits per patient per month increased slightly from 4.2 days in 2023 to 4.5 days in 2024. Seoul recorded the lowest frequency (3.2 days in 2023 and 3.0 days in 2024). Although some regional variations were observed, there were no major changes in the utilization frequency before and after the conflict (Figure 5A-C).

Changes in liver transplantation volume and regional disparities

The average number of LTs performed per month decreased from 115.6 in 2023 to 90.4 in 2024, representing an overall 22% decline. Within the capital region, the proportion of national LTs decreases minimally from 84.8% in 2023 to 80.2% in 2024. However, between March and July 2024, no LTs were per-

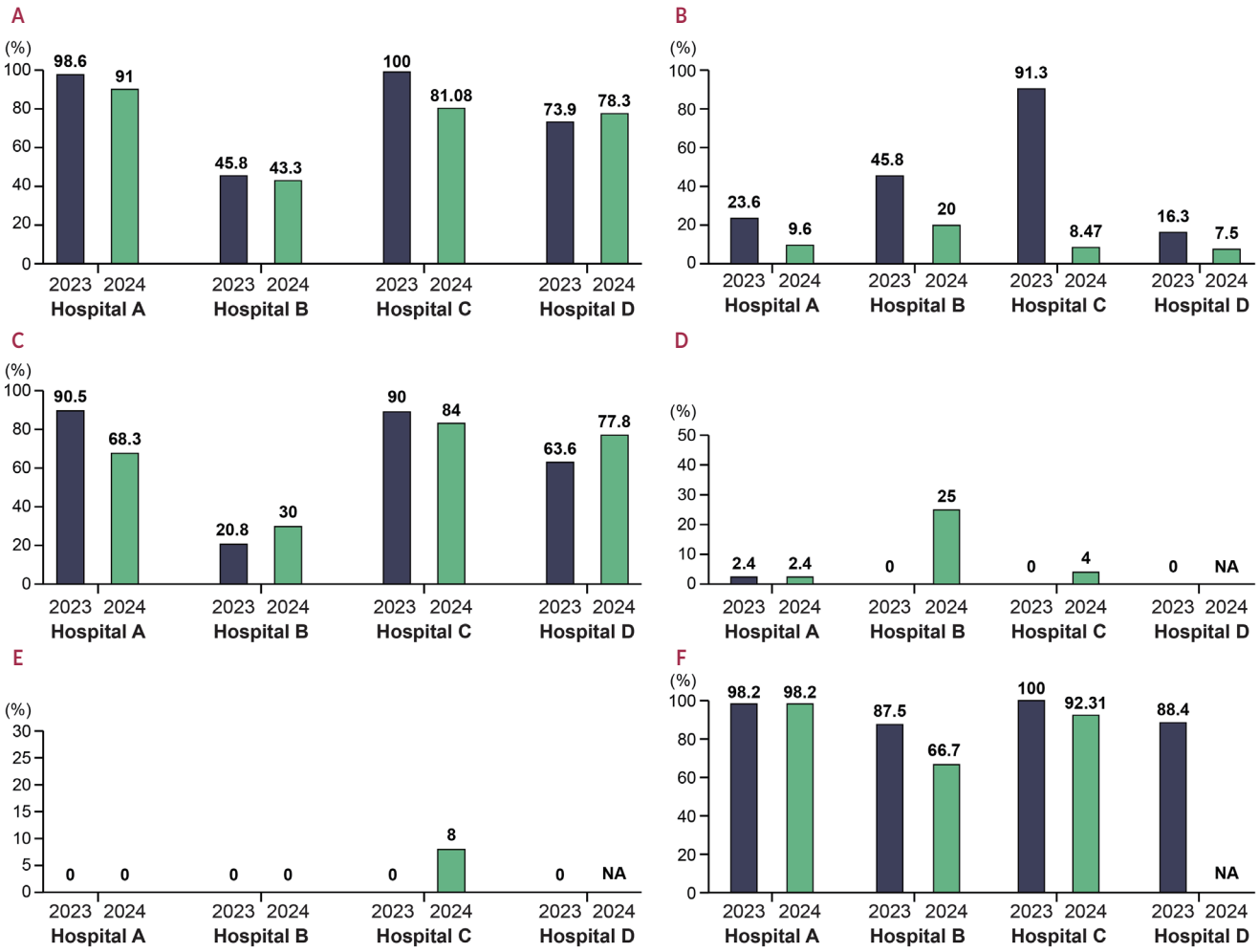


Figure 4. Changes in quality indicators for HCC care between 2023 and 2024. (A) Rate of patient education and counseling. (B) Proportion of patients managed through multidisciplinary care. (C) Proportion of patients who underwent surgery within 30 days of confirmed diagnosis. (D) 30-day postoperative readmission rate. (E) Postoperative mortality rate (defined as in-hospital death or death within 90 days of surgery). (F) Proportion of patients who underwent tumor surveillance testing (imaging and AFP or PIVKA-II assays) within 90 days after treatment. HCC, hepatocellular carcinoma; AFP, alpha-fetoprotein; PIVKA-II, protein induced by vitamin K absence or antagonist-II.

formed in several regions, including Chungbuk Province, Chungnam Province, Jeonbuk Province, Jeonnam Province, Gyeongsangbuk-do, and Jeju-do. These findings underscore the severe disparity in regional access to LT, suggesting that patients in certain areas experienced a complete disruption of transplant services during this period (Fig. 5D, E).

DISCUSSION

This study provides a comprehensive analysis of the changes in HCC management in Korea following the nationwide medical-policy conflict in 2024. By integrating institutional data from university hospitals in the Seoul Metropolitan Area with national healthcare big data, we assessed multidimensional changes in the clinical workforce, treatment patterns, quality indicators, facility distribution, and LT activity. The findings revealed significant structural disruptions and their downstream impacts on the management of a critical disease, HCC.

The most prominent change observed was a shift in the workforce composition. Residents were absent from seven of the eight participating hospitals, and the proportion of PAs nearly doubled. Although the number of attending physicians increased slightly, this was insufficient to fully compensate for the clinical void. This structural workforce shortage is particularly concerning in the context of HCC, which requires specialized expertise and multidisciplinary coordination for optimal care.

The marked reduction in the initial HCC treatment volume warrants further attention. A decrease of nearly 29% in the

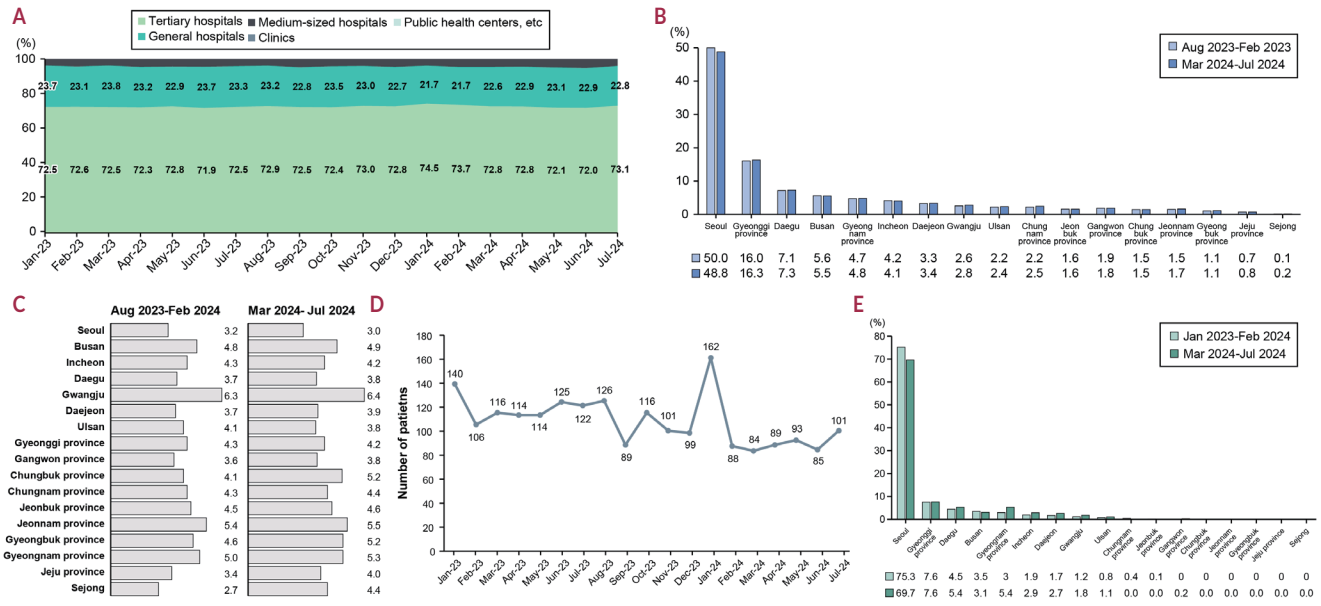


Figure 5. Changes in healthcare utilization and liver transplantation trends among patients with HCC in 2023 and 2024. (A) Proportion by type of healthcare institution. (B) Geographic distribution. (C) Monthly number of hospital visits. (D) Monthly number of LT nationwide. (E) Proportion of LT by region. HCC, hepatocellular carcinoma; LT, liver transplantation.

number of patients receiving first-line treatment and an increase in mUICC stage IV diagnoses suggest delays in detection and impaired access to care. Stage-specific analyses showed that in mUICC stage I HCC, the proportion of surgical resections declined, whereas TACE increased, raising concerns about possible deviations from standard-of-care practices. According to the 2022 KLCA–NCC Korea Practice Guideline, curative resection or ablation is recommended as the preferred initial treatment for patients with early-stage HCC whenever feasible.[7] For mUICC stage III disease, TARE use expanded, and for mUICC stage IV disease, systemic therapy utilization increased substantially. The reduced rate of curative surgery may indirectly reflect the diminished availability of surgical personnel and resources, with potential implications for long-term treatment outcomes.

The quality of care indicators exhibited a declining trend across multiple domains. The rates of patient education and multidisciplinary care decreased, whereas postoperative readmission and mortality rates slightly increased. However, these trends should be interpreted with caution, as 2024 was not a formal quality assessment year, and the available data were limited to a subset of institutions.

Geographical disparities in HCC care remain a critical issue. Approximately 70% of the patients continued to receive care in the Seoul Metropolitan Area, with Seoul alone accounting for half of all cases. This pattern reflects the continued concentration of medical resources in the capital and highlights the vulnerability of the regional healthcare systems. A 22% reduction in the national LT volume is of particular concern. In some regions, LTs were not performed during the study period, underscoring the severity of regional inequities in access to advanced care.

Interestingly, some parameters, such as the proportion of patients undergoing surgery within 30 days of diagnosis and the institutional distribution of care, remained relatively stable despite the severe workforce disruption. This relative stability may reflect structural characteristics of the Korean healthcare delivery system, including the concentration of surgical capacity in tertiary hospitals and the presence of established referral pathways for HCC care. These characteristics might explain why certain aspects of HCC management were less affected, suggesting that while vulnerabilities were exposed in many areas, some components of the system demonstrated relative resilience during the crisis.

This study has some limitations. First, it is based on retrospective data from a limited number of university hospitals in the Seoul Metropolitan Area, which may limit generalizability. Second, as a special consideration article derived from an invited presentation rather than a formal original research project, the scope of data collection was restricted to descriptive analyses from a relatively small number of hospitals. Nationwide case-level data and inferential statistical testing were therefore not feasible. Third, the short follow-up period precluded direct eval-

uation of long-term outcomes. However, evidence from other cancers with poor prognosis, such as lung and pancreatic cancer, suggests that treatment delays are associated with disease progression and worse survival, raising concern that similar long-term effects may occur in HCC.[8,9]

In conclusion, this study demonstrates that the 2024 medical-policy conflict in Korea exacerbated pre-existing structural vulnerabilities in the healthcare system, particularly regarding HCC management. The observed disruptions, including the absence of medical trainees, delays in diagnosis and treatment, deterioration in quality indicators, and reduction in LTs, may have substantial implications for patient outcomes. Regional inequities in healthcare access were further magnified, reinforcing the need for urgent, national-level interventions. To strengthen the resilience of essential healthcare services, it is crucial to ensure a sustainable supply of medical professionals, restore the operational capacity of public and tertiary hospitals, and implement targeted policy measures to address regional disparities in healthcare access and delivery.

Conflicts of Interests

Haeryoung Kim is an editorial board member of Journal of Liver Cancer and was not involved in the review process of this article. Otherwise, the authors have no conflicts of interest to disclose.

Ethic Statement

This study did not involve collection of individual patient-level data from each institution but was based on aggregated institutional statistics and publicly available data from the Health Insurance Review and Assessment Service. Therefore, it was exempt from IRB oversight. The exemption was approved by the Ajou University Hospital IRB (IRB No. AJOUIRB-EX-2025-379).

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Formal analysis: SSK
Supervision: BHK, SHK, JHK, HK, PJP, HPS, SJY, KTY, SMY, ML, JYC, JYC, DYK
Writing - original draft: SSK
Writing - review & editing: HY, BHK, SHK, JHK, HK, PJP, HPS, SJY, KTY, SMY, ML, JYC, JYC, DYK, JSL, MSK, KSK
Approval of final manuscript: all authors

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