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COMPARATIVE ANALYSIS OF THE RESULTS OF LAPAROSCOPIC AND OPEN GASTRECTOMY IN GASTRIC CANCER: GLOBAL TRENDS AND THE EXPERIENCE OF UZBEKISTAN

Nekova Kamilla Khusenovna
Bukhara State Medical Institute named after Abu Ali ibn Sino, Bukhara, Uzbekistan

Abstract. Gastric cancer remains one of the most serious global health challenges, holding a leading position in the structure of oncological morbidity and serving as the fourth leading cause of cancer-related mortality worldwide. Despite the introduction of modern chemotherapy and radiotherapy methods, radical surgical intervention remains the only potentially curative treatment for this disease. Over the past two decades, global surgical practice has undergone a significant transformation driven by the active implementation of minimally invasive technologies. Laparoscopic gastrectomy, initially proposed for early-stage cancer, is now increasingly considered an alternative to traditional open access even in locally advanced cases.

The relevance of a comparative analysis of these two approaches is dictated by the need to achieve a compromise between reducing surgical aggression and adhering to strict principles of oncological radicalism. Global trends, supported by the results of large multicenter randomized trials such as KLASS, JCOG, and CLASS, demonstrate the undeniable advantages of laparoscopy, including reduced intraoperative blood loss, decreased pain intensity, and shorter postoperative rehabilitation periods. However, technical challenges in performing adequate D2 lymph node dissection and ensuring equivalent long-term survival remain subjects of discussion in the international scientific community.

For the Republic of Uzbekistan, this issue is particularly acute due to consistently high gastric cancer incidence rates and the prevalence of cases diagnosed at advanced stages. The implementation of high-tech laparoscopic interventions into national clinical practice requires in-depth retrospective and prospective analysis to evaluate their reproducibility, safety, and clinical efficacy within the specific context of regional healthcare. Comparing international experience with the results of domestic oncological schools allows not only for the verification of the feasibility of widespread minimally invasive techniques but also for the optimization of patient selection algorithms, ultimately aimed at improving the quality of life and long-term prognosis for this patient category.

Keywords: gastric cancer, laparoscopic gastrectomy, open gastrectomy, minimally invasive surgery, statistics, Uzbekistan.

Relevance. Gastric cancer (GC) remains one of the leading causes of oncological morbidity and mortality worldwide. According to the World Health Organization (WHO) and the Global Burden of Disease study (GBD 2021), GC ranks fifth in incidence and fourth in the structure of cancer-related mortality [1]. More than one million new cases are registered globally each year. Of particular concern is the global trend toward an increase in the incidence of early-onset gastrointestinal cancers among individuals under the age of 50 [2].

In the Republic of Uzbekistan, the situation regarding gastrointestinal (GI) cancers also remains critical. Gastric cancer ranks second in the structure of oncological morbidity (10.8% of all cases), surpassed only by breast cancer [3]. Furthermore, according to international studies, Uzbekistan exhibits one of the highest growth rates of the age-standardized DALYs (ASDR) for early-onset GI cancer, with an Average Annual Percentage Change (AAPC) of 2.74 [2].

Surgical intervention remains the primary and only radical method for treating gastric cancer. In recent decades, global surgical practice has seen a significant shift toward minimally invasive interventions (MII). It is expected that by 2025, the share of MII in GI surgery will reach 70% [4]. In Uzbekistan, thanks to large-scale government investments in the healthcare sector (approximately €16.3 billion between 2021 and 2025), there is also an active implementation of laparoscopic technologies into routine clinical practice [5].

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Purpose of the study. To evaluate the efficacy and safety of laparoscopic gastrectomy (LG) compared to open gastrectomy (OG) based on global data and clinical experience in the Republic of Uzbekistan for the period 2020–2025.

Materials and Methods. The study is based on a comprehensive analysis of statistical data and clinical research results published between 2020 and 2025. Data from global registries (GBD 2021, GLOBOCAN), reports from the Ministry of Health of the Republic of Uzbekistan, and publications from leading research institutes—including the Bukhara Specialized Scientific and Practical Medical Center of Oncology and Radiology (RSSPMCO&R) and the Bukhara State Medical Institute named after Abu Ali ibn Sino—were utilized. To comparatively assess the effectiveness of surgical methods, the following parameters were analyzed: operative time, blood loss volume, frequency of postoperative complications, duration of hospitalization, and survival rates. Statistical data processing was performed using standard descriptive statistics methods.

Results of the study. Global experience with laparoscopic gastrectomy (LG) demonstrates its undeniable advantages over open gastrectomy (OG) in terms of reducing surgical trauma. Meta-analyses of large randomized clinical trials (such as KLASS in South Korea and JCOG in Japan) confirm that LG is associated with less blood loss, faster recovery of bowel function, and shorter hospital stays, with comparable overall and recurrence-free survival rates [6].

Additionally, robotic surgery is an actively developing field. Robot-assisted operations provide better visualization (3D) and greater freedom of instrument movement, which is particularly important when performing complex lymph node dissection (D2) in confined spaces. Studies show that robotic surgery has a lower conversion rate (transition to open surgery) compared to traditional laparoscopy [7].

The implementation of laparoscopic technologies in oncological surgery in Uzbekistan is occurring against the backdrop of a general modernization of the healthcare system. Data analysis for 2020–2025 shows that performing laparoscopic gastrectomy takes more time on average than open surgery; however, this is offset by a significant reduction in the complication rate [8].

Parameter	**Open Gastrectomy (OG)**	**Laparoscopic Gastrectomy (LG)**
Average operative time (min)	180 – 210	240 – 280
Intraoperative blood loss (ml)	350 – 500	100 – 150
Frequency of early complications (%)	15 – 20	4 – 6
Average hospital stay (days)	12 – 14	7 – 9

Table 1. *Comparative characteristics of surgical interventions for gastric cancer (averaged data from clinics in Uzbekistan, 2020–2025).*

The use of laparoscopic techniques significantly reduces the number of early postoperative and overall complications by 3.6 times [9]. This is of critical importance for oncological patients, as rapid recovery allows for an earlier start of adjuvant chemotherapy. Despite successes in surgical technique, overall survival rates for gastric cancer in Uzbekistan remain suboptimal. The five-year survival rate is approximately 18%, which is comparable to Western European figures but significantly lower than results in the USA (32%) and Japan (over 60%) [10].

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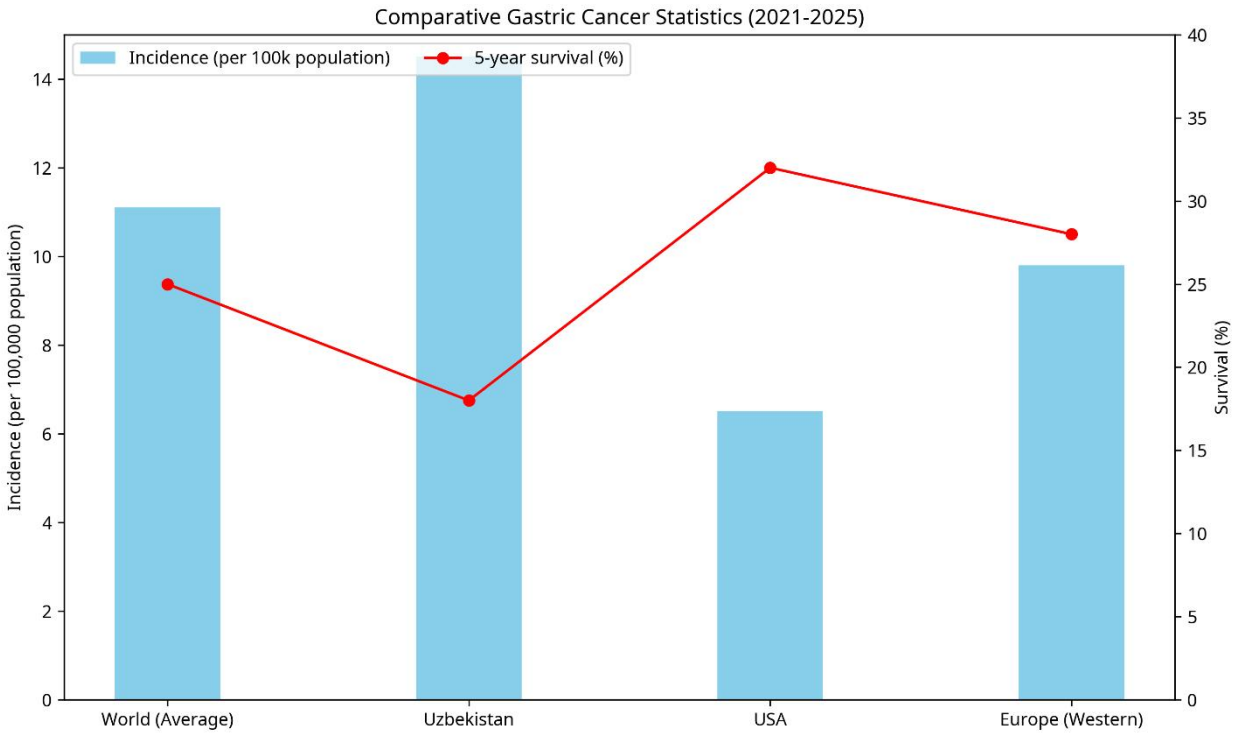

Figure 1. *Comparative statistics of incidence and 5-year survival in gastric cancer (2021–2025).*

The primary reason for low survival is late diagnosis. In Uzbekistan, unlike Japan or South Korea, there are no large-scale national endoscopic screening programs. Consequently, the majority of patients (approximately 60%) seek medical help at stages III–IV of the disease, when the possibilities for radical surgical treatment are limited [11].

The results of the analysis indicate that laparoscopic gastrectomy is a safe and oncologically adequate alternative to open surgery. The reduction in surgical trauma and accelerated rehabilitation (the ERAS concept – Enhanced Recovery After Surgery) make MII the preferred choice for treating gastric cancer.

However, the widespread implementation of LG in Uzbekistan faces several objective challenges. First, performing adequate lymph node dissection (D2), which is the standard of care for GC according to ESMO and NCCN recommendations, requires high surgical skill and a long learning curve. Second, the high cost of equipment and consumables limits the availability of these operations in regional clinics.

The 5-year survival rate for gastric cancer patients in Western Europe is 18%, and in the USA, it is 21%. In Uzbekistan, there are no national screening programs, which accounts for the high proportion of advanced cases." [10]

The global trend toward the rejuvenation of GI cancer (early-onset) dictates the need to revise approaches to prevention and early diagnosis. The increase in incidence among individuals under 50 is associated with changes in dietary habits, the rising prevalence of obesity, and *Helicobacter pylori* infection [2]. In this context, alongside the development of high-tech surgery, a priority task for the healthcare system of Uzbekistan should be the implementation of screening programs for high-risk groups.

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Conclusion. Laparoscopic surgery for gastric cancer demonstrates convincing advantages in reducing perioperative morbidity and accelerating patient recovery. The experience of clinics in Uzbekistan confirms global trends: MII allows for a several-fold reduction in complication rates compared to open surgery.

To further improve treatment outcomes for oncological patients in the Republic of Uzbekistan, a comprehensive solution is required: continued equipping of regional oncological dispensaries with modern endoscopic and laparoscopic equipment; the creation of simulation centers to train surgeons in complex minimally invasive interventions; and the development and implementation of national gastric cancer screening programs to detect the disease at early stages, when surgical treatment is most effective.

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