INTERNATIONAL JOURNAL OF COGNITIVE NEUROSCIENCE AND PSYCHOLOGY

ESOPHAGEAL CANCER: EPIDEMIOLOGY, PATHOGENESIS, AND MODERN APPROACHES TO MANAGEMENT

Mansurov Sardor Vali o'g'li
Asia International University, Bukhara, Uzbekistan

Abstract: Esophageal cancer (EC) is the seventh most common cancer worldwide and the sixth leading cause of cancer-related deaths. It is characterized by late diagnosis, aggressive progression, and poor prognosis. The two major histological types—squamous cell carcinoma (ESCC) and adenocarcinoma (EAC)—differ in epidemiology, etiology, and geographic distribution. Advances in diagnostic techniques, multimodal treatment, and targeted therapies have improved survival, yet outcomes remain unsatisfactory. This review summarizes current knowledge on epidemiology, risk factors, pathogenesis, diagnostic strategies, and modern treatment approaches for esophageal cancer.

Key words: Esophageal cancer, squamous cell carcinoma, adenocarcinoma, chemotherapy, immunotherapy, surgical management.

1. Introduction

Esophageal cancer accounts for approximately 604,000 new cases and 544,000 deaths annually (GLOBOCAN 2020). It predominantly affects men, with a male-to-female ratio of nearly 3:1. The disease has a poor 5-year survival rate, ranging from 15–25% globally, due to late-stage detection.

2. Epidemiology

Geographic distribution: ESCC is more common in Asia and Africa, while EAC predominates in Western countries.

Age: Most cases occur after age 50.

Gender: Higher prevalence in males.

Table 1. Global Incidence of Esophageal Cancer

Region	Predominant Type	Incidence (per 100,000)	Mortality (per 100,000)
East Asia	ESCC	20–30	18–28
North America	EAC	6–8	5–7
Sub-Saharan Africa	ESCC	12–18	11–16
Western Europe	EAC	7–10	6–9

3. Etiology and Risk Factors

3.1 Squamous Cell Carcinoma

- ✓ Tobacco smoking
- ✓ Alcohol consumption
- ✓ Nitrosamine-rich diet
- ✓ Hot beverage intake
- ✓ Human papillomavirus (possible role)

3.2 Adenocarcinoma

- ✓ Barrett's esophagus

- ✓ Gastroesophageal reflux disease (GERD)
- ✓ Obesity
- ✓ High-fat diet
- ✓ Male gender

4. Pathogenesis

ESCC develops due to chronic mucosal irritation leading to dysplasia and carcinoma, while EAC follows progression from GERD to Barrett's esophagus, dysplasia, and adenocarcinoma. Molecular pathways include p53 mutations, EGFR amplification, HER2 overexpression, and PD-L1 expression.

5. Diagnosis

- ✓ Endoscopy with biopsy: Gold standard.
- ✓ Endoscopic ultrasound (EUS): Tumor depth and nodal status.
- ✓ CT, PET-CT, MRI: Staging and metastasis detection.
- ✓ Molecular markers: HER2, PD-L1, and MSI for targeted therapy eligibility.

6. Treatment Approaches

6.1 Early-Stage Disease

Endoscopic mucosal resection (EMR) or submucosal dissection (ESD).

6.2 Locally Advanced Disease

Neoadjuvant chemoradiotherapy (CROSS regimen: carboplatin + paclitaxel). Esophagectomy (transthoracic or transhiatal). Minimally invasive and robotic-assisted techniques are gaining popularity.

6.3 Advanced/Metastatic Disease

Systemic chemotherapy: Platinum-based regimens. Targeted therapy: Trastuzumab (HER2-positive EAC). Immunotherapy: PD-1 inhibitors (nivolumab, pembrolizumab).

Table 2. Treatment Modalities and Outcomes

Stage	Treatment	5-Year Survival Rate
Early (T1a)	EMR/ESD	80–90%
Locally advanced	Chemoradiotherapy + surgery	35–45%
Metastatic	Chemotherapy ± immunotherapy	5–10%

7. Prognosis

Prognosis depends on stage at diagnosis. Lymph node metastasis is the most important prognostic factor. Early detection through screening in high-risk populations is essential.

8. Future Directions

Development of molecular-targeted therapies, biomarker-driven personalized treatment, wider use of immunotherapy in earlier stages, and liquid biopsy for early detection and monitoring.

9. Conclusion

Esophageal cancer remains a global health burden with poor prognosis. Advances in multimodal management, particularly the integration of targeted therapies and immunotherapy, offer hope for improved survival. Early detection and prevention strategies remain the cornerstone of reducing mortality.

References:

1. Vali o'g'li, M. S. KIDNEY CANCER: EPIDEMIOLOGY AND TREATMENT.
2. Valiyevich, M. S. (2024). Specific Morphofunctional Characteristics of the Kidney Caused by Brain Damage in Various Emergency Situations. Research Journal of Trauma and Disability Studies, 3(4), 286-289.
3. *PROSTATE CANCER: PATHOLOGY AND TREATMENT. (2024). International Bulletin of Medical Sciences and Clinical Research, 4(11), 65-70. https://doi.org/10.37547/*
4. MUSHAKLARNING TARAQQIYOTI. MUSHAKLARNING YORDAMCHI APPARATI. *TADQIQOTLAR. UZ*, *40*(3), 94-100.
5. Ergasheva, G. (2025). CYTOLOGICAL DIAGNOSIS OF THYROID DISEASES: PRACTICAL SIGNIFICANCE AND MODERN APPROACHES. *Modern Science and Research*, *4*(5), 1649-1656.
6. Ergasheva, G. (2025). ACROMEGALY: A SEVERE NEUROENDOCRINE DISORDER WITH MULTISYSTEM MANIFESTATIONS. *Modern Science and Research*, *4*(3), 1123-1131.
7. Ergasheva, G. (2024). THE ROLE OF CORRECTIONAL PEDAGOGY IN ORGANIZING THE EDUCATION OF CHILDREN WITH DISABILITIES. *Ethiopian International Journal of Multidisciplinary Research*, *11*(06), 206-207.
8. Zikrillaev, F. A. (2024). Cardiorehabilitations from Physiotherapeutic Treatments in Cardiovascular Diseases. *American Journal of Bioscience and Clinical Integrity*, *1*(10), 96-102.
9. Зикриллаев, Ф. А. (2024). ОПРЕДЕЛЕНИЕ РАННИХ ФАКТОРОВ РИСКА ХРОНИЧЕСКОЙ БОЛЕЗНИ ПОЧЕК В ПУБЕРТНОМ ВОЗРАСТЕ. *Modern education and development*, *16*(7), 166-180.
10. Toxirovna, E. G. (2024). QALQONSIMON BEZ KASALLIKLARIDAN HASHIMOTO TIREODIT KASALLIGINING MORFOFUNKSIONAL O'ZIGA XOSLIGI. *Modern education and development*, *16*(7), 120-135.
11. Toxirovna, E. G. (2024). REVMATOID ARTRIT: BO'G'IMLAR YALLIG'LANISHINING SABABLARI, KLINIK BELGILARI, OQIBATLARI VA ZAMONAVIY DAVOLASH YONDASHUVLARI. *Modern education and development*, *16*(7), 136-148.
12. Эргашева, Г. Т. (2024). ОЦЕНКА КЛИНИЧЕСКОЙ ЭФФЕКТИВНОСТИ ОРЛИСТАТА У БОЛЬНЫХ ОЖИРЕНИЕМ И АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ. *Modern education and development*, *16*(7), 92-105.
13. Ergasheva, G. T. (2024). THE SPECIFICITY OFAUTOIMMUNE THYROIDITIS IN PREGNANCY. *European Journal of Modern Medicine and Practice*, *4*(11), 448-453.
14. Эргашева, Г. Т. (2024). ИССЛЕДОВАНИЕ ФУНКЦИИ ЩИТОВИДНОЙ ЖЕЛЕЗЫ ПРИ ТИРЕОИДИТЕ ХАШИМОТО. *Modern education and development*, *16*(7), 106-119.
15. Toxirovna, E. G. (2024). GIPOFIZ ADENOMASINI NAZORAT QILISHDA KONSERVATIV JARROHLIK VA RADIATSIYA TERAPIYASINING UZOQ MUDDATLI SAMARADORLIGI. *Modern education and development*, *16*(7), 79-91.
16. ERGASHEVA, G. T. (2024). OBESITY AND OVARIAN INSUFFICIENCY. *Valeology: International Journal of Medical Anthropology and Bioethics*, *2*(09), 106-111.
17. Ergasheva, G. T. (2024). Modern Methods in the Diagnosis of Autoimmune Thyroiditis. *American Journal of Bioscience and Clinical Integrity*, *1*(10), 43-50.
18. Tokhirovna, E. G. (2024). COEXISTENCE OF CARDIOVASCULAR DISEASES IN PATIENTS WITH TYPE 2 DIABETES. *TADQIQOTLAR. UZ*, *40*(3), 55-62.

19. Toxirovna, E. G. (2024). DETERMINATION AND STUDY OF GLYCEMIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS WITH COMORBID DISEASES. *TADQIQOTLAR. UZ*, *40*(3), 71-77.
20. Toxirovna, E. G. (2024). XOMILADORLIKDA QANDLI DIABET KELTIRIB CHIQARUVCHI XAVF OMILLARINI ERTA ANIQLASH USULLARI. *TADQIQOTLAR. UZ*, *40*(3), 63-70.
21. Toxirovna, E. G. (2024). QANDLI DIABET 2-TIP VA KOMORBID KASALLIKLARI BO'LGAN BEMORLARDA GLIKEMIK NAZORAT. *TADQIQOTLAR. UZ*, *40*(3), 48-54.
22. Tokhirovna, E. G. (2024). MECHANISM OF ACTION OF METFORMIN (BIGUANIDE) IN TYPE 2 DIABETES. *JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH*, *3*(5), 210-216.
23. Tokhirovna, E. G. (2024). THE ROLE OF METFORMIN (GLIFORMIN) IN THE TREATMENT OF PATIENTS WITH TYPE 2 DIABETES MELLITUS. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, *4*(4), 171-177.
24. Эргашева, Г. Т. (2024). Эффект Применения Бигуанида При Сахарным Диабетом 2 Типа И Covid-19. *Research Journal of Trauma and Disability Studies*, *3*(3), 55-61.
25. Toxirovna, E. G. (2024). QANDLI DIABET 2 TUR VA YURAK QON TOMIR KASALLIKLARINING BEMOLARDA BIRGALIKDA KECHISHI. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *38*(7), 202-209.
26. Эргашева, Г. Т. (2024). СОСУЩЕСТВОВАНИЕ ДИАБЕТА 2 ТИПА И СЕРДЕЧНО-СОСУДИСТЫХ ЗАБОЛЕВАНИЙ У ПАЦИЕНТОВ. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *38*(7), 219-226.
27. Эргашева, Г. Т. (2024). СНИЖЕНИЕ РИСКА ОСЛОЖНЕНИЙ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ 2 ТИПА И СЕРДЕЧНО-СОСУДИСТЫМИ ЗАБОЛЕВАНИЯМИ. *Образование Наука И Инновационные Идеи В Мире*, *38*(7), 210-218.
28. Tokhirovna, E. G. (2024). CLINICAL AND MORPHOLOGICAL ASPECTS OF THE COURSE OF ARTERIAL HYPERTENSION. *Лучшие интеллектуальные исследования*, *12*(4), 234-243.
29. Tokhirovna, E. G. Studying the Causes of the Relationship between Type 2 Diabetes and Obesity. *Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN*, 2456-6470.
30. Toxirovna, E. G. (2024). ARTERIAL GIPERTENZIYA KURSINING KLINIK VA MORFOLOGIK JIHATLARI. *Лучшие интеллектуальные исследования*, *12*(4), 244-253.
31. Эргашева, Г. Т. (2024). НОВЫЕ АСПЕКТЫ ТЕЧЕНИЕ АРТЕРИАЛЬНОЙ ГИПЕРТОНИИ У ВЗРОСЛОГО НАСЕЛЕНИЕ. *Лучшие интеллектуальные исследования*, *12*(4), 224-233.
32. Эргашева, Г. Т. (2024). ФАКТОРЫ РИСКА РАЗВИТИЯ САХАРНОГО ДИАБЕТА 2 ТИПА. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *36*(5), 70-74.
33. Эргашева, Г. Т. (2024). ОСЛОЖНЕНИЯ САХАРНОГО ДИАБЕТА 2 ТИПА ХАРАКТЕРНЫ ДЛЯ КОГНИТИВНЫХ НАРУШЕНИЙ. *TADQIQOTLAR. UZ*, *30*(3), 112-119.
34. Эргашева, Г. Т. (2023). Исследование Причин Связи Диабета 2 Типа И Ожирения. *Research Journal of Trauma and Disability Studies*, *2*(12), 305-311.
35. Tokhirovna, E. G. (2024). Risk factors for developing type 2 diabetes mellitus. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *36*(5), 64-69.
36. Toxirovna, E. G. (2024). QANDLI DIABET 2-TUR VA O'LIMNI KELTIRIB CHIQARUVCHI SABABLAR. *Лучшие интеллектуальные исследования*, *14*(4), 86-93.

37. Tokhirovna, E. G. (2023). Study of clinical characteristics of patients with type 2 diabetes mellitus in middle and old age. *Journal of Science in Medicine and Life*, *1*(4), 16-19.
38. Toxirovna, E. G. (2024). GIPERPROLAKTINEMIYA KLINIK BELGILARI VA BEPUSHTLIKKA SABAB BO'LUVCHI OMILLAR. *Лучшие интеллектуальные исследования*, *14*(4), 168-175.
39. Toxirovna, E. G. (2023). QANDLI DIABET 2-TUR VA SEMIZLIKNING O'ZARO BOG'LIQLIK SABABLARINI O'RGANISH. *Ta'lim innovatsiyasi va integratsiyasi*, *10*(3), 168-173.
40. Saidova, L. B., & Ergashev, G. T. (2022). Improvement of rehabilitation and rehabilitation criteria for patients with type 2 diabetes.
41. Эргашева, Г. Т. (2023). Изучение Клинических Особенностей Больных Сахарным Диабетом 2 Типа Среднего И Пожилого Возраста. *Central Asian Journal of Medical and Natural Science*, *4*(6), 274-276.
42. Toxirovna, E. G. (2023). O'RTA VA KEKSA YOSHLI BEMORLARDA 2-TUR QANDLI DIABET KECHISHINING KLINIKO-MORFOLOGIK XUSUSIYATLARI. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *33*(1), 164-166.
43. Ergasheva, G. T. (2022). QANDLI DIABET BILAN KASALLANGANLARDA REABILITATSIYA MEZONLARINI TAKOMILASHTIRISH. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, *2*(12), 335-337.
44. Ergasheva, G. (2024). METHODS TO PREVENT SIDE EFFECTS OF DIABETES MELLITUS IN SICK PATIENTS WITH TYPE 2 DIABETES. *Журнал академических исследований нового Узбекистана*, *1*(2), 12-16.
45. ГТ, Э., & Саидова, Л. Б. (2022). СОВЕРШЕНСТВОВАНИЕ РЕАБИЛИТАЦИОННО-ВОССТАНОВИТЕЛЬНЫХ КРИТЕРИЕВ БОЛЬНЫХ С СД-2 ТИПА. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, *2*(12), 206-209.
46. Toxirovna, E. G. (2025). YURAK-QON TOMIR TIZIMI KASALLIKLARIDA BEMORLAR PARVARISHINING O'ZIGA XOSLIGI. *Modern education and development*, *20*(2), 38-46.
47. Ergasheva, G. (2025). PECULIARITIES WHEN ACCOMPANIED BY HYPOTHYROIDISM AND IODINE DEFICIENCY IN PATIENTS WITH ADRENAL GLAND PATHOLOGY. *Modern Science and Research*, *4*(2), 1133-1140.
48. Tokhirovna, E. G. (2024). Relationship of the Functional States of the Thyroid and the Reproductive System in Women under Iodine Deficiency. *Journal of Science in Medicine and Life*, *2*(6), 89-94.
49. Зикриллаев, Ф. А. (2024). РОЛЬ ПРЕПАРАТОВ ЛЕРКАНИДИПИНА И АМЛОДИПИНА В ЛЕЧЕНИИ АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИИ ПРИ ХРОНИЧЕСКОЙ БОЛЕЗНИ ПОЧЕК. *Modern education and development*, *16*(7), 213-229.
50. Xalimova, Y. (2025). MODERN CONCEPTS OF BIOCHEMISTRY OF BLOOD COAGULATION. *Modern Science and Research*, *4*(3), 769-777.
51. Xalimova, Y. (2025). JIGAR SIRROZIDAGI GEMATOLOGIK TADQIQOTLAR. *Modern Science and Research*, *4*(4), 409-418.
52. Халимова, Ю. (2025). ГЕМАТОЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ ПРИ ЦИРРОЗЕ ПЕЧЕНИ. *Modern Science and Research*, *4*(4), 419-428.
53. Xalimova, Y. (2025). HEMATOLOGICAL STUDIES IN LIVER CIRRHOSIS. *Modern Science and Research*, *4*(4), 1066-1074.

54. Халимова, Ю. С. (2025). СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ О БИОХИМИИ СВЕРТЫВАНИЯ КРОВИ. *Tadqiqotlar*, *59*(1), 16-23.
55. Халимова, Ю. С. (2025). АКТУАЛЬНЫЕ ПРОБЛЕМЫ И КЛИНИЧЕСКИЕ ОСОБЕННОСТИ ТЕЧЕНИЯ СИНДРОМА ПОЛИКИСТОЗНЫХ ЯИЧНИКОВ. *Tadqiqotlar*, *59*(1), 24-34.
56. Халимова, Ю. С. (2025). КЛИНИЧЕСКИЕ И МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ГЕМОЛИТИЧЕСКОЙ БОЛЕЗНИ НОВОРОЖДЕННЫХ. *Tadqiqotlar*, *59*(1), 9-15.