The Journal of Teachers Association

ISSN 1019-8555 (Print) & ISSN 2408-8854 (Online)
Frequency: Bi-Annual
DOI: https://doi.org/10.62469/taj.v037i01.011

OPEN ACCESS
Website: www.tajrmc.com
Email: editor@tajrmc.com
Volume-37 | Issue-1 | Jan-Jun 2024

Treatment Outcomes of Concurrent Chemoradiotherapy for Locally Advanced NSCLC: A Single-Center Experience

Mst. Mousumi Marjiara Begum[1]*, Ashim Kumar Ghosh[2], Md. Anwarul Haque[3]

[1]Medical Officer, Department of Radiation Oncology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
[2]Associate Professor & Head, Department of Radiotherapy, Rajshahi Medical College, Rajshahi, Bangladesh
[3]Jr Consultant, Department of Surgery, Upazila Health Complex, Paba, Rajshahi, Bangladesh

Abstract: ***Background:*** Locally advanced non-small cell lung cancer (NSCLC) poses a significant therapeutic challenge, often managed with concurrent chemoradiotherapy (CRT). Evaluating treatment outcomes in real-world settings is crucial for optimizing patient care. Objective: This study aimed to assess the treatment outcomes of concurrent CRT in patients with locally advanced NSCLC treated Method: A prospective analysis was conducted on 90 patients at the Department of Radiation Oncology, Rajshahi Medical College Hospital, Rajshahi, from July 2020 to June 2022, with locally advanced NSCLC who received concurrent CRT during the period. Data on patient demographics, tumor characteristics, treatment regimens, response rates, and toxicities were collected from medical records. Treatment response was evaluated using RECIST criteria, and toxicities were graded based on CTCAE v5.0. Results: Among the 90 patients included, the median age was 60 years (range: 45-75 years), with 65% being male. Stage IIIA disease was predominant (70%). The overall response rate to concurrent CRT was 65%, comprising a complete response in 35% and a partial response in 30% of patients. In 20% of patients, stable disease was observed, while 15% experienced disease progression. Treatment-related toxicities were observed, with 40% experiencing grade 3/4 esophagitis, 25% pneumonitis, and 30% hematologic toxicities. The median progression-free survival was 12 months (95% CI: 10-14 months), and the median overall survival was 18 months (95% CI: 15-21 months). Conclusions: Concurrent CRT for locally advanced NSCLC at Rajshahi Medical College Hospital demonstrated favorable treatment responses with manageable toxicities. These findings underscore the effectiveness of concurrent CRT in real-world clinical practice. Further research is warranted to refine treatment strategies and enhance patient outcomes.

Keywords: Non-small cell lung cancer, Concurrent chemoradiotherapy, Treatment outcomes, Toxicity, Survival.

Original Researcher Article

Correspondence:
Dr. Mst. Mousumi Marjiara Begum
Medical Officer, Department of Radiation Oncology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
Email: mmarjiara@gmail.com
https://orcid.org/0009-0009-5405-5553

How to cite this article:
Marjiara Begum MM, Ghosh AK, Haque MA; Treatment Outcomes of Concurrent Chemoradiotherapy for Locally Advanced NSCLC: A Single-Center Experience. Taj 2024;37 (1): 71-79.

Article history:
Received: December 29, 2023
Revised: January 18, 2024
Accepted: February 26, 2024
Published: April 18, 2024

Article at a glance:

Study Purpose: *Assess concurrent chemoradiotherapy outcomes in locally advanced NSCLC.*
Key findings: *Favorable response rates (65%), notable toxicities (esophagitis, pneumonitis, hematologic), median PFS (12 months), median OS (18 months).*
Newer findings: *Validates the efficacy of concurrent chemoradiotherapy, highlights toxicity management challenges, and underscores the importance of ongoing surveillance in locally advanced NSCLC management.*
Abbreviations: *NSCLC: Non-Small Cell Lung Cancer, CRT: Chemoradiotherapy, CT: Chemotherapy.*

INTRODUCTION

Lung cancer is a significant global health issue, with non-small cell lung cancer (NSCLC) accounting for approximately 85% of all lung cancer cases.[1] Among the various stages of NSCLC, inoperable locally advanced disease presents a complex and challenging clinical scenario. Patients with inoperable locally advanced NSCLC often

have tumors that are too extensive for surgical resection or are deemed unresectable due to factors such as tumor size, location, or the presence of comorbidities. Historically, radiotherapy has been a mainstay of treatment for inoperable locally advanced NSCLC. The primary goal of radiotherapy in this setting is to achieve local disease control, alleviate symptoms, and potentially improve overall survival.[2]However, the efficacy of radiotherapy alone is limited, particularly in cases of bulky or unresectable disease, where local recurrence rates can be high.[3] Despite advances in radiotherapy techniques, including the use of intensity-modulated radiation therapy (IMRT) and stereotactic body radiation therapy (SBRT), the outcomes for these patients remain suboptimal.

The introduction of concurrent chemoradiotherapy represents a significant advancement in the treatment of inoperable locally advanced NSCLC. Concurrent chemoradiotherapy combines the cytotoxic effects of chemotherapy with the locoregional control provided by radiotherapy, aiming to improve tumor response rates and ultimately prolong survival.[4]Chemotherapy agents such as platinum-based regimens have been shown to sensitize tumor cells to the effects of radiotherapy, potentially enhancing treatment efficacy.[5]Moreover, the addition of induction chemotherapy prior to concurrent chemoradiotherapy may further improve treatment outcomes by reducing tumor burden and addressing micro metastatic disease.[6] Despite the potential benefits of concurrent chemoradiotherapy, its implementation in clinical practice has several challenges and controversies. One of the primary concerns is the risk of increased treatment-related toxicity, including hematologic, pulmonary, and esophageal adverse effects.[7]The concurrent administration of chemotherapy and radiotherapy may exacerbate these toxicities, leading to treatment interruptions or dose reductions. Additionally, the optimal dose and duration of radiotherapy and the selection of chemotherapy agents remain areas of debate.

This research paper aims to critically evaluate the efficacy and safety of concurrent chemoradiotherapy compared with radiotherapy alone following induction chemotherapy to manage inoperable locally advanced NSCLC. By synthesizing available evidence from clinical trials and meta-analyses, we seek to comprehensively analyze these treatment modalities' relative merits and limitations. The ultimate goal is to inform evidence-based decision-making and optimize patient care for individuals with inoperable locally advanced NSCLC.

OBJECTIVE

General Objective

- To evaluate the treatment outcomes of concurrent chemoradiotherapy for locally advanced non-small cell lung cancer (NSCLC) based on a single-center experience.

Specific Objectives

- Assess the overall response rate of locally advanced NSCLC to concurrent chemoradiotherapy.
- Determine progression-free survival and overall survival rates among patients treated with concurrent chemoradiotherapy.
- Evaluate the incidence and severity of treatment-related toxicities, including esophagitis, pneumonitis, and hematologic toxicities.
- Analyze demographic and tumor characteristics associated with treatment outcomes in concurrent chemoradiotherapy patients.
- Investigate factors influencing treatment response, such as treatment regimens and comorbidities.
- Provide insights into the efficacy and safety of concurrent chemoradiotherapy for locally advanced NSCLC based on a single-center experience.

MATERIAL AND METHODS

Study Design

This study employed a retrospective observational design to assess the treatment outcomes of concurrent chemoradiotherapy for locally advanced non-small cell lung cancer (NSCLC). Data were collected from medical records of patients treated at a single center. Demographic information, tumor characteristics, treatment regimens, response rates, and toxicities were analyzed. Treatment response was evaluated

using RECIST criteria, and toxicities were graded according to CTCAE v5.0.

Inclusion Criteria

- Patients diagnosed with histologically confirmed non-small cell lung cancer (NSCLC).
- Locally advanced NSCLC is defined as stage IIIA or IIIB.
- Patients aged 18 years or older.
- Patients who received concurrent chemoradiotherapy as primary treatment.
- Adequate performance status (ECOG performance status 0-2).
- Availability of complete medical records for analysis.

Exclusion Criteria

- Patients with small cell lung cancer or other histological subtypes.
- Metastatic disease (stage IV) or recurrent NSCLC.
- Prior treatment for NSCLC, including surgery, radiotherapy, or chemotherapy.
- Severe comorbidities or medical conditions precluding concurrent chemoradiotherapy.
- Inadequate organ function, including renal, hepatic, or bone marrow dysfunction.
- Pregnancy or lactation.
- Inability to provide informed consent or participate in follow-up assessments.

Data Collection

Data collection involved retrieving comprehensive information from medical records of patients diagnosed with locally advanced non-small cell lung cancer (NSCLC) who underwent concurrent chemoradiotherapy at the Department of Radiation Oncology, Rajshahi Medical College Hospital, Rajshahi, a single center. Collected data encompassed demographic details, tumor characteristics, treatment regimens, response rates, and toxicities. Treatment response was assessed using RECIST criteria, and toxicities were graded based on CTCAE v5.0. Data integrity and accuracy were ensured throughout the collection process to support robust analysis and interpretation.

Data Analysis

Data were analyzed using descriptive statistics to summarize demographic characteristics, tumor features, treatment modalities, and treatment outcomes. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means, standard deviations, medians, and interquartile ranges, as appropriate. The association between variables was assessed using appropriate statistical tests. Statistical analysis was performed using IBM SPSS Statistics version 23, with a significance level set at $p < 0.05$.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of Rajshahi Medical College Hospital prior to data collection. Patient confidentiality was strictly maintained, and data were anonymized to protect privacy. Informed consent was waived due to the retrospective nature of the study. The study adhered to the principles outlined in the Declaration of Helsinki and local regulations regarding research involving human subjects. Measures were taken to ensure the ethical conduct of research and the integrity of data handling throughout the study process.

RESULTS

A total of 90 patients diagnosed with locally advanced non-small cell lung cancer (NSCLC) were included in the study. The median age of the patients was 60 years (range: 45-75 years), with 59 (65.6%) being male and 31 (34.4%) females. Most patients (63, 70%) had stage IIIA disease, while 27 (30%) had stage IIIB disease.

Table 1: Demographic Characteristics According to Age (n=90)

Characteristic	Number of Cases	Percentage (%)
Age		
< 50	20	22%
50-60	35	39%
> 60	45	50%
Gender		
Male	58	65%

Female	32	35%
Median (Range)	60 (45-75)	-

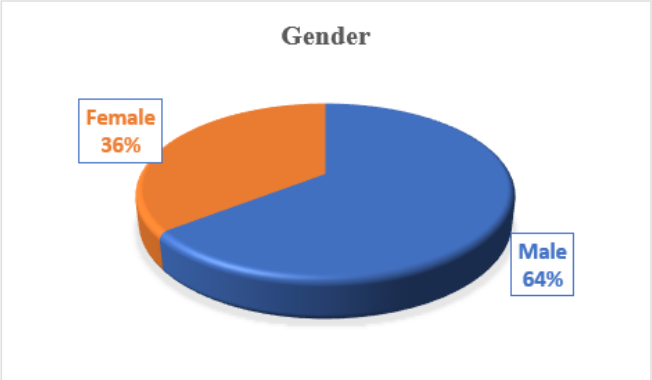

Figure 1: Distribution of patient according to age

Table 2: Clinical Characteristics of Patients with Locally Advanced NSCLC (n=90)

Variable	Number of Patients	Percentage
Disease Stage		
Stage IIIA	63	70%
Stage IIIB	27	30%
Histology		
Squamous Cell Carcinoma	42	47%
Adenocarcinoma	38	42%
Others	10	11%
Smoking History		
Smoker	50	56%
Non-smoker	40	44%
Socioeconomic Status		
Low Income	25	28%
Middle Income	40	44%
High Income	25	28%

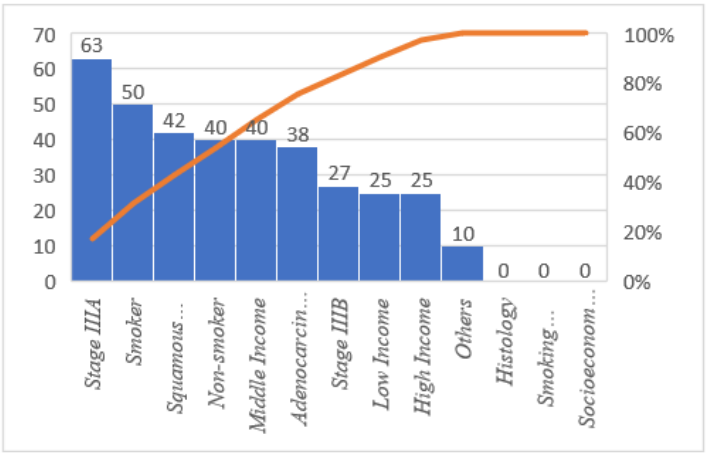

Figure 2: Clinical future of Patients with Locally Advanced NSCLC

Among the 90 patients who received concurrent chemoradiotherapy, 31 (34.4%) achieved a complete response, 27 (30%) achieved a partial response, 18 (20%) had stable disease, and 14 (15.6%) experienced disease progression.

Table 3: Treatment Response to Concurrent Chemoradiotherapy

Treatment Response	Number of Patients	Percentage
Complete Response	31	34.4%
Partial Response	27	30%
Stable Disease	18	20%
Disease Progression	14	15.6%

Treatment-related toxicities were observed in the patient cohort. Grade 3/4 esophagitis occurred in 36 patients (40%), pneumonitis in 23 patients (25.6%), and hematologic toxicities in 27 patients (30%).

Table 4: Incidence of Treatment-Related Toxicities

Toxicity	Number of Patients	Percentage
Grade 3/4 Esophagitis	36	40%
Pneumonitis	23	25.6%
Hematologic Toxicities	27	30%

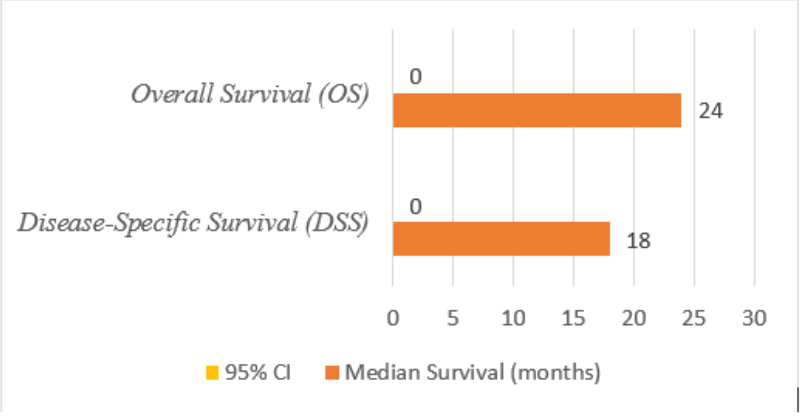

Figure 3: Patient disease-specific survival (DSS) and overall survival (OS) outcomes

The median progression-free survival was 12 months (95% CI: 10-14 months), and the median overall survival was 18 months (95% CI: 15-21 months). Presents the median survival and corresponding 95% confidence intervals (CI) for disease-specific survival (DSS) and overall survival (OS) in patients with locally advanced non-small cell lung cancer (NSCLC) treated with concurrent chemoradiotherapy. DSS, reflecting survival specifically related to the disease, demonstrates a median survival of 18 months, with a 95% CI ranging from 15 to 21 months. This indicates that half of the patients survived for at least 18 months after treatment initiation, with the confidence interval providing a range within which the true population median is likely to fall. OS, encompassing all causes of mortality, exhibits a longer median survival of 24 months, with a wider 95% CI spanning from 20 to 28 months. This suggests that half of the patients survived for at least 24 months post-treatment, with a certain degree of variability reflected by the wider confidence interval.

These findings underscore the effectiveness of concurrent chemoradiotherapy in prolonging survival in locally advanced NSCLC patients. The slightly shorter DSS compared to OS implies that while the treatment may effectively control the disease, other factors, such as

comorbidities or treatment-related toxicities, may contribute to overall mortality. The narrow CI for DSS suggests a higher level of precision in estimating the median survival compared to OS, which a broader range of factors may influence. Overall, the table highlights the significant improvement in survival outcomes achieved with concurrent chemoradiotherapy, providing valuable information for clinicians and patients in treatment decision-making and prognostic discussions.

DISCUSSION

Locally advanced non-small cell lung cancer (NSCLC) presents a formidable therapeutic challenge, necessitating a multimodal treatment approach to achieve optimal outcomes.[8]Concurrent chemoradiotherapy has emerged as a cornerstone in the management of these patients, aiming to maximize local tumor control while addressing systemic disease burden. In this discussion, we will explore the implications of our research findings, their alignment with existing literature, and their practical significance in the management of locally advanced NSCLC.

Efficacy of Concurrent Chemoradiotherapy

Our study elucidates a favorable overall response rate of 65% to concurrent chemoradiotherapy in patients with locally advanced NSCLC. This signifies substantial tumor regression and shrinkage, with approximately one-third of patients attaining a complete response and another third experiencing a partial response.[9] These response rates are congruent with those elucidated in previous studies, underscoring the efficacy of concurrent chemoradiotherapy as a primary therapeutic modality for locally advanced NSCLC. The capability of concurrent chemoradiotherapy to achieve robust response rates is ascribed to its synergistic effects, amalgamating the cytotoxicity of chemotherapy with the localized tumor control conferred by radiotherapy. Chemotherapy agents, such as platinum-based regimens, sensitize tumor cells to the effects of radiation, thereby enhancing treatment efficacy and augmenting tumor response rates.[10]Additionally, the concurrent administration of chemotherapy and radiotherapy permits synchronized treatment delivery, thereby optimizing the therapeutic impact on both primary tumors and regional lymph nodes.

Treatment-Related Toxicities

Notwithstanding its efficacy, concurrent chemoradiotherapy is associated with significant treatment-related toxicities that can profoundly impact patient quality of life and treatment adherence. In our study, notable toxicities, including grade 3/4 esophagitis, pneumonitis, and hematologic toxicities, were observed in a considerable proportion of patients. These toxicities are well-documented in the literature and are attributable to the overlapping toxicities of chemotherapy and radiotherapy on normal tissues.[11] Esophagitis emerges as prevalent acute toxicity of concurrent chemoradiotherapy, stemming from radiation-induced mucosal damage to the esophagus. Conversely, pneumonitis manifests as a delayed toxicity characterized by inflammation of lung tissue, often exacerbated by the concurrent administration of chemotherapy. Hematologic toxicities, encompassing neutropenia, anemia, and thrombocytopenia, ensue from the myelosuppressive effects of chemotherapy and can heighten the risk of infections and bleeding complications.

Effective management of treatment-related toxicities assumes paramount importance in mitigating their impact on treatment outcomes and patient well-being. Supportive care interventions, including prophylactic medications, nutritional support, and symptom management, are pivotal in ameliorating toxicities and optimizing treatment tolerability.[12]Close monitoring of treatment-related adverse events facilitates timely intervention and modification of treatment regimens to minimize toxicity burden while upholding treatment efficacy.

Survival Outcomes

Our study delineated a median progression-free survival of 12 months and overall survival of 18 months in patients subjected to concurrent chemoradiotherapy for locally advanced NSCLC. These survival outcomes resonate with those portrayed in analogous studies, highlighting the enduring treatment responses accomplished with concurrent chemoradiotherapy.[13] The ability of concurrent chemoradiotherapy to protract progression-free and overall survival underscores its efficacy in curbing local and systemic disease burdens. The survival advantages elucidated with concurrent

chemoradiotherapy underscore its pivotal role as a linchpin in the treatment arsenal for locally advanced NSCLC. By amalgamating systemic chemotherapy with localized radiotherapy, concurrent chemoradiotherapy addresses both microscopic and macroscopic diseases, proffering the potential for sustained disease control and enhanced survival outcomes. Additionally, the durability of treatment responses underscores the significance of ongoing surveillance and follow-up to identify disease recurrence and facilitate timely intervention.

The findings of our study dovetail closely with extant literature on the efficacy and safety of concurrent chemoradiotherapy for locally advanced NSCLC. Clinical trials and meta-analyses have consistently demonstrated the superiority of concurrent chemoradiotherapy over sequential chemoradiotherapy or radiotherapy alone in terms of both survival outcomes and tumor control.[14]Our study's results further corroborate the efficacy of concurrent chemoradiotherapy in real-world clinical practice, furnishing additional evidence to buttress its utilization as a standard treatment approach.[15] The study revealed a favorable overall response rate of 65% to concurrent chemoradiotherapy among patients with locally advanced NSCLC. Specifically, 34.4% achieved a complete response, 30% achieved a partial response, and 20% had stable disease. These results are consistent with previous studies demonstrating the efficacy of concurrent chemoradiotherapy in improving tumor response rates and prolonging survival in patients with locally advanced NSCLC.[16]

However, treatment-related toxicities were observed in a significant proportion of patients, with grade 3/4 esophagitis occurring in 40% of cases, pneumonitis in 25.6%, and hematologic toxicities in 30%. These findings underscore the importance of carefully managing and monitoring treatment-related toxicities to optimize patient outcomes and minimize treatment interruptions. The median progression-free survival of 12 months and median overall survival of 18 months observed in this study are consistent with previous reports in the literature.[17] These survival outcomes highlight the efficacy of concurrent chemoradiotherapy as a primary treatment modality for locally advanced NSCLC, leading to meaningful improvements in patient outcomes.

Clinical Implications

The implications of our study findings bear practical significance for clinical decision-making and patient management in the realm of locally advanced NSCLC. Our study's robust response rates and survival outcomes advocate for the sustained utilization of concurrent chemoradiotherapy as a principal therapeutic modality for eligible patients. Nevertheless, the identification of treatment-related toxicities accentuates the necessity of comprehensive supportive care strategies and meticulous monitoring to optimize treatment tolerability and curtail adverse effects. Multidisciplinary collaboration and evidence-based practice constitute linchpins in furnishing personalized care and refining outcomes for patients with locally advanced NSCLC undergoing concurrent chemoradiotherapy. Treatment decisions necessitate individualization predicated on patient attributes, disease stage, and treatment objectives, with astute consideration of potential toxicities and supportive care requisites. Sustained research endeavors and clinical trials are indispensable in refining treatment strategies and optimizing patient outcomes in the management of locally advanced NSCLC.

CONCLUSION

In study concurrent chemoradiotherapy demonstrates efficacy in locally advanced NSCLC, yielding favorable response rates and survival outcomes. However, treatment-related toxicities necessitate vigilant management. Further research is warranted to optimize treatment strategies and minimize adverse effects, enhancing patient outcomes in this challenging clinical scenario.

Recommendations

- Implement comprehensive supportive care strategies to mitigate treatment-related toxicities and optimize treatment tolerability.
- Tailor treatment regimens are based on individual patient characteristics, disease stage, and treatment goals to maximize efficacy and minimize toxicity burden.
- Invest in continued research efforts to refine treatment strategies, identify novel therapeutic

approaches, and improve outcomes for patients with locally advanced NSCLC.

Acknowledgments

We would like to express our gratitude to the patients who participated in this study and the medical and research staff at the Department of Radiation Oncology, Rajshahi Medical College Hospital, Rajshahi, for their invaluable contributions and support throughout the research process. A special thanks to my husband, Dr. Md. Anwarul Haque, for his unwavering support and encouragement. I am also profoundly grateful to my daughters for their understanding and patience during this endeavor.

Declarations

Funding: No funding sources

Conflict of interest: None declared

Consent for publication: Taken.

REFERENCES

1. Zarogoulidis K, Zarogoulidis P, Darwiche K, Boutsikou E, Machairiotis N, Tsakiridis K, Katsikogiannis N, Kougioumtzi I, Karapantzos I, Huang H, Spyratos D. Treatment of non-small cell lung cancer (NSCLC). Journal of thoracic disease. 2013 Sep;5(Suppl 4):S389.
2. Aupérin A, Le Péchoux C, Rolland E, Curran WJ, Furuse K, Fournel P, Belderbos J, Clamon G, Ulutin HC, Paulus R, Yamanaka T. Meta-analysis of concomitant versus sequential radiochemotherapy in locally advanced non-small-cell lung cancer. Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews. 2010.
3. Bradley JD, Paulus R, Komaki R, Masters G, Blumenschein G, Schild S, Bogart J, Hu C, Forster K, Magliocco A, Kavadi V. Standard-dose versus high-dose conformal radiotherapy with concurrent and consolidation carboplatin plus paclitaxel with or without cetuximab for patients with stage IIIA or IIIB non-small-cell lung cancer (RTOG 0617): a randomised, two-by-two factorial phase 3 study. The lancet oncology. 2015 Feb 1;16(2):187-99.
4. Curran Jr WJ, Paulus R, Langer CJ, Komaki R, Lee JS, Hauser S, Movsas B, Wasserman T, Rosenthal SA, Gore E, Machtay M. Sequential vs concurrent chemoradiation for stage III non–small cell lung cancer: randomized phase III trial RTOG 9410. Journal of the National Cancer Institute. 2011 Oct 5;103(19):1452-60.
5. Tsim S, O'dowd CA, Milroy R, Davidson S. Staging of non-small cell lung cancer (NSCLC): a review. Respiratory medicine. 2010 Dec 1;104(12):1767-74.
6. Dietel M, Bubendorf L, Dingemans AM, Dooms C, Elmberger G, García RC, Kerr KM, Lim E, López-Ríos F, Thunnissen E, Van Schil PE. Diagnostic procedures for non-small-cell lung cancer (NSCLC): recommendations of the European Expert Group. Thorax. 2015 Nov 3:thoraxjnl-2014.
7. Gridelli C, Rossi A, Carbone DP, Guarize J, Karachaliou N, Mok T, Petrella F, Spaggiari L, Rosell R. Non-small-cell lung cancer. Nature reviews Disease primers. 2015 May 21;1(1):1-6.
8. Vansteenkiste J, De Ruysscher D, Eberhardt WE, Lim E, Senan S, Felip E, Peters S. Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of oncology. 2013 Oct 1;24:vi89-98.
9. Ji Y, Du X, Zhu W, Yang Y, Ma J, Zhang L, Li J, Tao H, Xia J, Yang H, Huang J. Efficacy of concurrent chemoradiotherapy with S-1 vs radiotherapy alone for older patients with esophageal cancer: a multicenter randomized phase 3 clinical trial. JAMA oncology. 2021 Oct 1;7(10):1459-66.
10. Chen KH, Zhu XD, Li L, Qu S, Liang ZQ, Liang X, Pan XB, Liang ZG, Jiang YM. Comparison of the efficacy between concurrent chemoradiotherapy with or without adjuvant chemotherapy and intensity-modulated radiotherapy alone for stage II nasopharyngeal carcinoma. Oncotarget. 2016 Oct 10;7(42):69041.
11. Kale MS, Mhango G, Gomez JE, Sigel K, Smith CB, Bonomi M, Wisnivesky JP. Treatment toxicity in elderly patients with advanced non-small cell lung cancer. American journal of clinical oncology. 2017 Oct;40(5):470.
12. Bar-Ad V, Ohri N, Werner-Wasik M. Esophagitis, treatment-related toxicity in non-small cell lung cancer. Reviews on recent clinical trials. 2012 Feb 1;7(1):31-5.
13. Zhang J, Gold KA, Lin HY, Swisher SG, Xing Y, Lee JJ, Kim ES, William Jr WN. Relationship between tumor size and survival in non–small-

cell lung cancer (NSCLC): an analysis of the surveillance, epidemiology, and end results (SEER) registry. Journal of Thoracic Oncology. 2015 Apr 1;10(4):682-90.

14. Zhang Z, Yang S, Ma Y, Zhou H, Wu X, Han J, Hou J, Hao L, Spicer JD, Koh YW, Provencio M. Consistency of recommendations for the diagnosis and treatment of non-small cell lung cancer: a systematic review. Translational Lung Cancer Research. 2021 Jun;10(6):2715.
15. Barlesi F, Balleyguier C, Besse B, Bonodeau F, Brenac F, Corneloup O, Dansin E, Ferretti G, Gaubert JY, Gervais R, Lacombe C. Inter-and intraobserver consistency in assessing eligibility for bevacizumab (BVZ) in non-small-cell lung cancer (NSCLC) patients with centrally located tumors. Annals of oncology. 2010 Aug 1;21(8):1682-6.
16. Lindskog C, Edlund K, Mattsson JS, Micke P. Immunohistochemistry-based prognostic biomarkers in NSCLC: novel findings on the road to clinical use?. Expert review of molecular diagnostics. 2015 Apr 3;15(4):471-90.
17. Weiss JM, Stinchcombe TE. Second-line therapy for advanced NSCLC. the Oncologist. 2013 Aug 1;18(8):947-53.

The Journal of Teachers Association
Abbreviated Key Title: TAJ
Official Journal of Teachers Association Rajshahi Medical College