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A PROSPECTIVE COHORT STUDY ON THE RADIATION THERAPY COMBINED WITH OR WITHOUT CISPLATIN IN PATIENTS WITH CONTRASTING CANCER EPITOME

AUTHOR: *G.Y. Srawan Kumar, N. Kalyani, P.Varalakshmi, Dr. D.R.Brahma Reddy, Dr. N.V.S.Praveen.

COLLEGE: Nalanda Institute of Pharmaceutical Sciences, Sattenapalli, Guntur.

ABSTRACT: The scrutiny was carried out to evaluate the efficacy and toxicity of radiation therapy with or without cisplatin-based chemotherapy in different types of cancers. Cisplatin chemotherapy medication used to treat a numerous number of cancers. Effective against various type of cancers including carcinomas germ cell tumors lymphomas and sarcomas. cisplatin is a cytotoxic agent which kills cancer cells by damaging DNA synthesis. Cisplatin induced DNA damage activates various signalling pathways to prevent or promote cell death. Radio therapy is safe and highly effective cancer treatment that precisely spaying the surrounding healthy tissue. Combination therapies of cisplatin with other treatments have been highly considered to overcome drug resistance and reduced toxicity. Combination of cisplatin and radiotherapy is increasingly being used to treat advanced cancers. In this exploration the effectiveness and the counter actions occurred by the combination treatment of cisplatin and radiation therapy in cancer were well detailed.

KEYWORDS: Chemotherapy, Radiation therapy, Nephrotoxicity, Ototoxicity, Brachytherapy, Cytotoxic agents, Head and Neck Cancers, Cisplatin drug resistance, Chemoradiation therapy, Gynaecological Cancers

INTRODUCTION: Cancer is the uncontrolled growth and development of the cells in the body and is one of the four most reasons of deaths throughout the world [(1)]. There are over hundred types of different types of cancers that are categorized on the basis of the affected tissue or organ of the human body [(2)]. Cancers have an inhibited replication and inability to response to the growth signals and resulting in a rest of the cell division [(3)], continuous angiogenesis, resistance to apoptosis and the ability to infiltrate other tissues. Currently cancers can be cured by means of both conventional tonic approaches like surgery and Radiation therapy and Chemotherapy in non-conventional or complementary therapeutic methods include hormone therapy, Immunotherapy and Nano therapy [(4)]. The treatment given for cancer is variable and dependent on a number of factors including that type location and amount of the disease and health status of the patient. Most treatments are designed to either directly kill or remove the cancer cells or lead to their eventual death by depriving them of signals needing for survival [(5)]. The goal of any treatment to kill as many cancer cells as possible and minimise the death of normal cells. In most cancers multiple treatment options must be used together to get the best results [(6).]

CISPLATIN CHEMOTHERAPY: Cisplatin is used for the treatment of metastatic testicular tumors and metastatic ovarian tumors and advanced bladder cancer in various types of head and neck cancers [(7)].

PHARMACODYNAMICS: cisplatin is an antineoplastic in the class of alkylating agents and is used to treat various forms of cancer [8]. Cisplatin stops tumor growth by crosslinking guanine bases in double helix strands-directly attacking DNA. This makes trends unable to uncoil and separate. As this is necessary in DNA replication the cells no longer divide [9].

MECHANISM OF ACTION: There are 3 different types of mechanisms:

1. Attachment of alkyl group to DNA bases resulting in DNA being fragmented by the repair enzymes in their attempts to replace the alkylating bases preventing DNA synthesis and RNA transcription from the affected DNA [10].
2. DNA damage with the formation of crosslinks
3. The induction of mispairing of nucleotides leading to mutations.

PHARMACOKINETIC DATA

- Bioavailability – 100% intravenous
- Protein binding - > 95%
- Elimination half-life – 30 – 100hrs.
- Excretion – renal

Cisplatin dose: 50-70mg/m^2 IV per cycle once every three to four weeks depending on the extent or prior exposure to radiation therapy or prior to chemotherapy [11].

Pre-treatment Hydration: Pre-treatment hydration with 1 to 2 litres of fluid infused for 8 to 12 hrs prior to cisplatin injection dose is recommended. The drug is then diluted into litres of 5% dextrose in ½ or 1/3 normal saline containing 37.5 G of mannitol, and infused for 6to8 hour period. Adequate hydration and urinary output must be maintained during the following 24 hrs [12].

Caution: repeat course of cisplatin should not be given until the serum creatinine is below 1.5 mg per 100ml. a repeat course should not be given until circulating blood elements are at an acceptable level (platelets >1lac/mm^3, WBC >4000/mm3) [13]. Subsequent doses of cisplatin should not be given until and audiometric analysis indicates that auditory acuity is with in normal limits.

Cisplatin Resistance: Cisplatin combination chemotherapy is the cornerstone of treatment of many cancers. Initial Platinum responsiveness is high but the majority of cancer patients will eventually relapse with cisplatin resistant disease. Mini mechanism of cisplatin resistance has been proposed including changes in cellular uptake and efflux of the drug and inhibition of apoptosis and increase a DNA repair. Drug paclitaxel may be useful in the treatment of cisplatin resistant cancer [14,15].

ABSORPTION: Cisplatin doses of 20-120mg, the concentration of platinum is highest in liver prostate and kidney, somewhat lower in bladder muscle testicles, pancreas and spleen, and lowest in bowel adrenal heart-lung cerebrum and cerebellum, platinum is present in the tissues fall as long as 180 days after the last administration [16].

Radio sensitization: Cisplatin potentiates the sub lethal damage induced by radiation therapy and inhibits repair of potentiality of lethal damage. Cisplatin radio sensitization is a free radical mediated action. It has the ability to scavenge for free electrons formed by the interaction between radiation and DNA. The reduction of the platinum moiety stabilizes DNA damage by making it irreparable. Additive effects of cisplatin are improved when the drug is administered with fractionated radiation therapy. This is explained by its inhibition of sub lethal damage repair [17].

Regimens:

- **High dose regimen:** Cisplatin 100mg/m^2 intravenous, given for 3 cycles every 21 days concomitantly with radiation therapy.
- **Weekly regimen:** Cisplatin 40mg/m^2 intra venously given weekly concomitantly with radiation therapy.

- **Infusion regimen:** Cisplatin 40mg/m^2/day +5Flouro uracil 60mg/m^2/day given by continuous IV infusion during first and 6th weeks of radiation therapy.

Benefit of adding chemotherapy to radio therapy comes at the cost of markedly increased acute toxicity [18].

RADIATION THERAPY: Radiation therapy is used to kill cancerous cells in the body and also measures the dose correctly to avoid unnecessary damage to normal cells in the body. Radiation targets cells that are in the process of replication when therapy is applied as it is not selective for any respective tumor. Administration of the correct dose is important to ensure optimal efficiency with minimal side effects [19].

STANDARD DOSE OF RADIATION: Gray (Gy) is the unit used to measure the total amount of radiation that the patient is exposed to also recorded as Centigray (Cgy) which is 0.01 of a single Gy unit [20].

Adjuvant therapy doses typically range from 45-60Gy for the treatment of breast, head, and neck cancers. Typically, these doses are divided into multiple smaller doses that are given over a period of one to two months. The specific dose for each patient depends on the location and severity of the tumor. The dose determination is therefore at the discretion of the radiation oncologist who is responsible for such therapeutic decisions.

DOSE FRACTIONING: The total radiation dose is usually divided into several fractions. For most patients who require radiation therapy, the total dose is broken up into daily doses of five times a week for a total period of five to eight weeks. Some cancers, however, require treatment more often than once per day [21].

DOSE FREQUENCY:

Hyper fractionated radiation divided the daily dose into two treatments each day, which means that the patient is subjected to smaller but more frequent doses of radiation over the same period of time.

TREATMENT LENGTH:

Standard treatment with radiation therapy lasts for five to eight weeks, depending on the specific type of cancer being treated, and is at the discretion of the oncologist supervising the therapy.

Accelerated radiation refers to when the total dose is administered over a shorter period of time than usual. This involves more frequent doses, usually more often than once daily, to administer the equivalent total dose over a shorter period of time. This can be useful in some types of cancer that require a more aggressive treatment regimen.

Changes in the dose frequency and treatment length do not alter the total exposure to radiation and, as a result, the long-term effects remain similar. However, different treatment fractioning and accelerated treatments are often associated with a faster onset of effects, both on normal and cancerous cells [22].

PATIENT POSITIONING DURING TREATMENT:

The exact position of the patient during the radiation treatment is of utmost importance to ensure that the correct dose of radiation is emitted to the intended area of the body.

It is common practice for skin to be marked to indicate where the treatment should be focussed. The patient should be instructed to remain in the same position without moving for the entire duration of each treatment fraction.

A mould or cast can be helpful to assist patients in maintaining the correct position while radiation therapy is in progress. Additionally, areas of the body that do not contain tumor cells should be subjected to as little radiation as possible, often necessitating blocks or shields to protect others part of the body [23].

MATERIALS AND METHODS

Study design: This study includes patients diagnosed with contrasting cancer in Omega hospitals, Guntur, to study the effectiveness of radiation combination of cisplatin administration as treatment of their respective diagnosis.

Time period: 6 respective months.

Source of study: Omega hospitals. "A unit of Guntur institute of oncology**".**

Methods:

- By reviewing case proforma
- By reviewing Chemoradiation plan of treatment.

Study population: All outpatients and inpatients who are diagnosed by contrasting cancers of Omega hospitals, Guntur.

Sample size: Total 350 patients were studied and analysed.

Inclusion criteria:

- All adult patients of age more than 18 years with contrasting cancers administrating Chemoradiation
- The data thus obtained was entered in the Microsoft Excel software, was expressed the percentage and proportions.

Exclusion criteria: HIV patients, paediatrics and improper details in prescription.

Results and discussion:

Total 350 cancer patients were studied, 145 (41%) were males and 205 (59%) were females. They have 59 different types of cancers, out of which majority is cervix cancer of 90 participants with 25.70%, the majority age range was 51-60 years with 39 participants of 26.89%. There are 13 types of combinations of different adverse reactions during treatment. In these 59 different types of cancers 32 types are observed by the administration of cisplatin concurrent radiation therapy. At the end of study out of 350 patients, 7 patients lost their lives due to disease progression.

Table 1Distribution of patients based on gender(n=350)

No. of patients (n)	Male (n)	Male percentage (%)	Female (n)	Female percentage (%)
350	145	41%	205	59%

Table 1 comprises distribution of data based on gender, the males with 41% and females with 59%, the females are found to be more in number than males. It is depicted in **Fig.1.** According to Prashant Mathur et al., (2020) The projected incidence of patients with cancer in India among males was 679,421 (94.1 per 100,000) and among females 712,758 (103.6 per 100,000) for the year 2020. Females have more incidence than males [(24)].

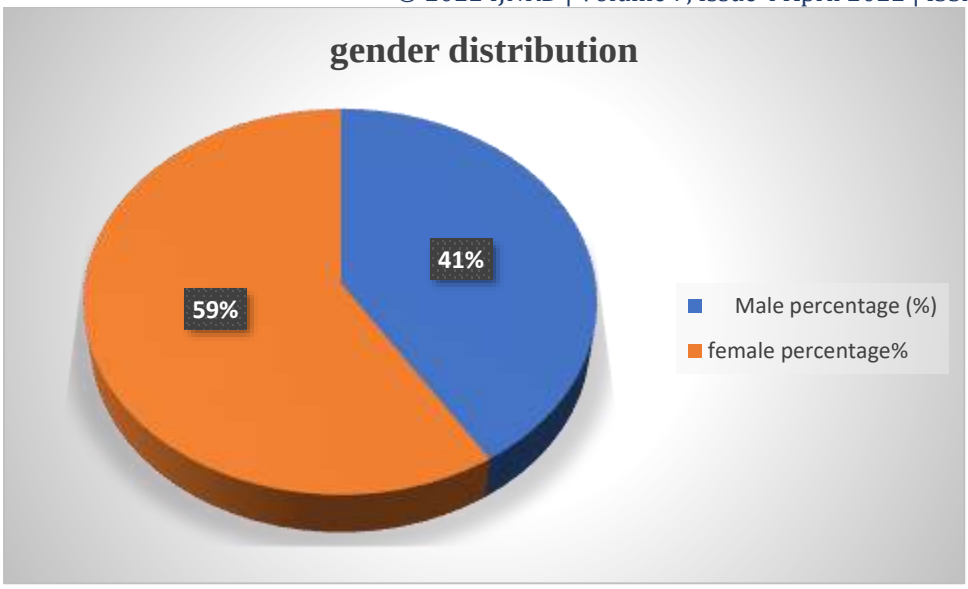

Figure1-Gender distribution among patients(n=350)

Table 2 shows distribution of data based on age range of interval 10 years i.e., 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-90 with percentage of frequency of males are 3.44%, 8.96%, 20%, 26.89%, 23.44%, 15.17%, 2.06% and females are 2.92%, 10.73%, 36.09%, 26.82%, 18.04%, 4.39%, 0.97%. It is depicted in **Figure2.** Patients with highest diagnosed rate of cancer at age intervals between 41-50,51-60,61-70. In these intervals almost 71(41.96%) male patients are diagnosed with different cancers as many patients contain regular habits of smoking and betel chewing. More female patients 166 (80.97%) are diagnosed with different gynaecological and breast cancers. According to Kendal.k.Morgan et al., (2020) You're more likely to get cancer as you get older. In fact, age is the biggest risk factor for the disease. More than **nine** out of 10 cancers are diagnosed in people 45 and older. Seniors older than 74 make up almost 28% of all new cancer cases [(25)].

Table- 2distribution of patients based on age(n=350)

Age (years)	Male(n)	Male percentage (%)	Female (n)	Female percentage (%)
21-30	5	3.44	6	2.92
31-40	13	8.96	22	10.73
41-50	29	20	74	36.09
51-60	39	26.89	55	26.82
61-70	34	23.44	37	18.04
71-80	22	15.17	9	4.39
81-90	3	2.06	2	0.97

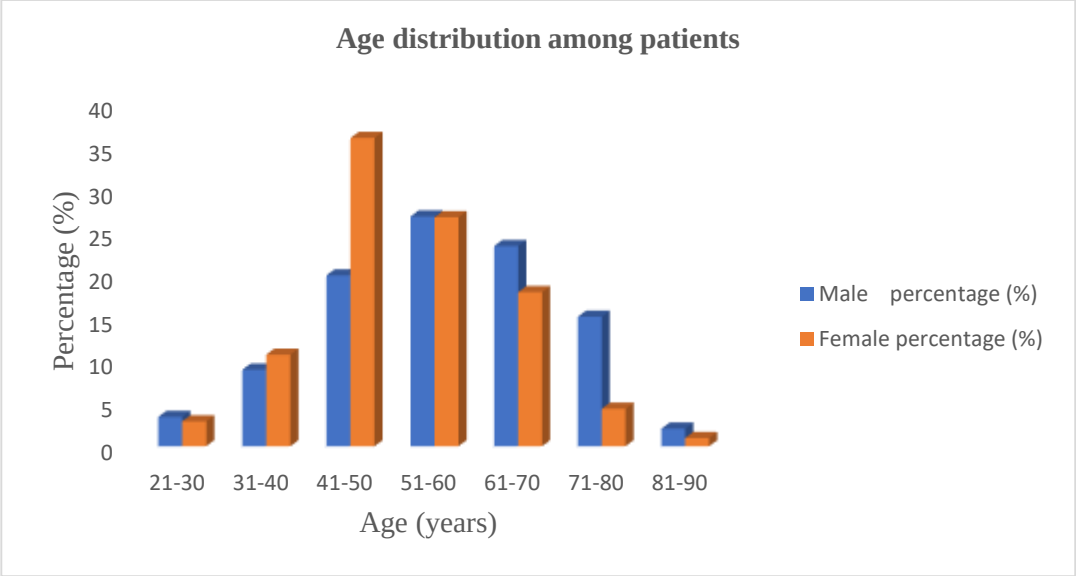

Figure 2. Distribution of patients based on Age(n=350)

Table 3 shows distribution of radiation therapy in patients based on gender, 3DCRT is the most observed radiation therapy in our research with 22.75% in males and 54.63% in females. Others like IMRT in males with percentage of 6.89%, females with percentage of 6.82%. VMAT in males with percentage of 60%, females with percentage of 33.17% and IGRT in males with percentage of 10.34%, females with percentage of 5.36%. It is depicted in **Figure3.**

- Most of the patients received VMAT (velocity modulated arc radiation therapy) 44.28% and 3DCRT (3-dimensional chemo radiation therapy) 41.42%.
- Most patients received radical radiation therapy type of treatment of concurrent chemo radiation mode with dose 55-66 Gray fractions in 25-35 days interval. According to Dandan xu et al., (2017) 3D-CRT is developed and proven in the late 1990s as a preferred treatment for cancer for its better target coverage and significantly decreased toxicity to normal organs compared to 2D-CRT. Later, the IMRT technique is proven to be more effective than 3D-CRT in target coverage, dose homogeneity, and reducing toxicity to normal organs [(26)].

Table 3Distribution of patients among radiation type(n=350)

Type	Male (n)	Male percentage (%)	Female (n)	Female percentage (%)
3DCRT	33	22.75	112	54.63
IMRT	10	6.89	14	6.82
VMAT	87	60	68	33.17
IGRT	15	10.34	11	5.36

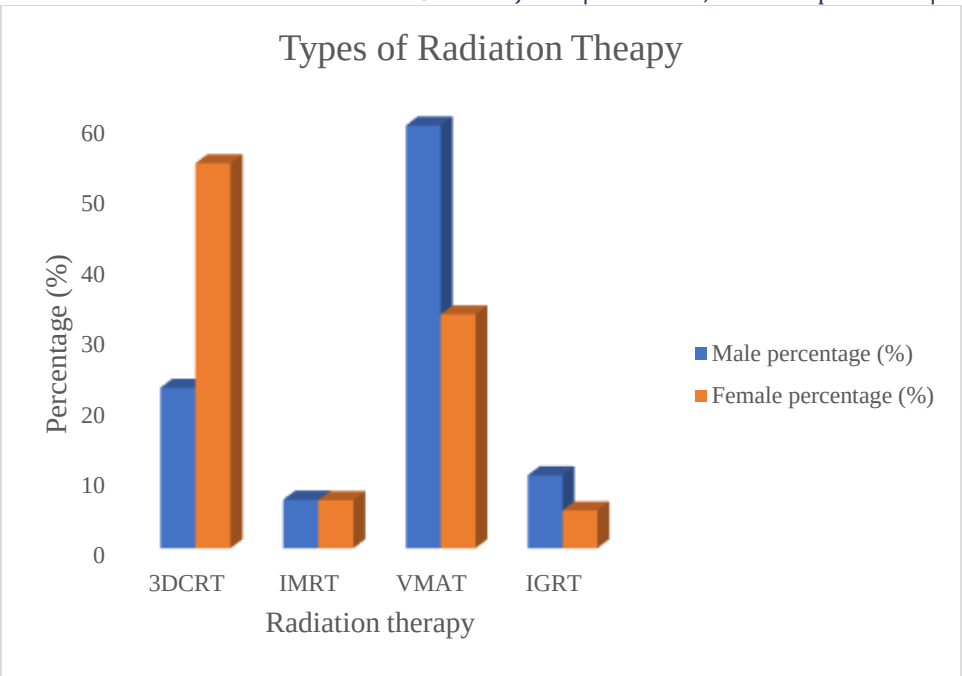

Figure 3: Distribution of patients among radiation type(n=350)

Table 4 – shows distribution of radiation treatment with cisplatin in patients based on gender. Radiation with cisplatin has 28.96% in males and 42.93% in females and radiation without cisplatin has 71.03% in males and 57.56% in females. It is depicted in **Figure4.**

- Distribution of patients with combination of chemoradiation treatment. These 129 patients received total treatment with daily radiation and weekly cisplatin chemo therapy.
- Among these 129 patients one patient received 3 weekly cisplatin of dose 100mg/ml where all other patients received weekly cisplatin chemotherapy with a dose of 50-60mg/ml.
- The only patient administered 3 weekly cisplatin has no comorbidities or any other health issue other than carcinoma.

+

Table 4-Distribution of patients with combination of chemoradiation treatment(n=350)

Type of treatment	Male (n)	Male percentage (%)	Female (n)	Female percentage (%)
radiation with cisplatin	42	28.96	87	42.43
radiation without cisplatin	103	71.03	118	57.56

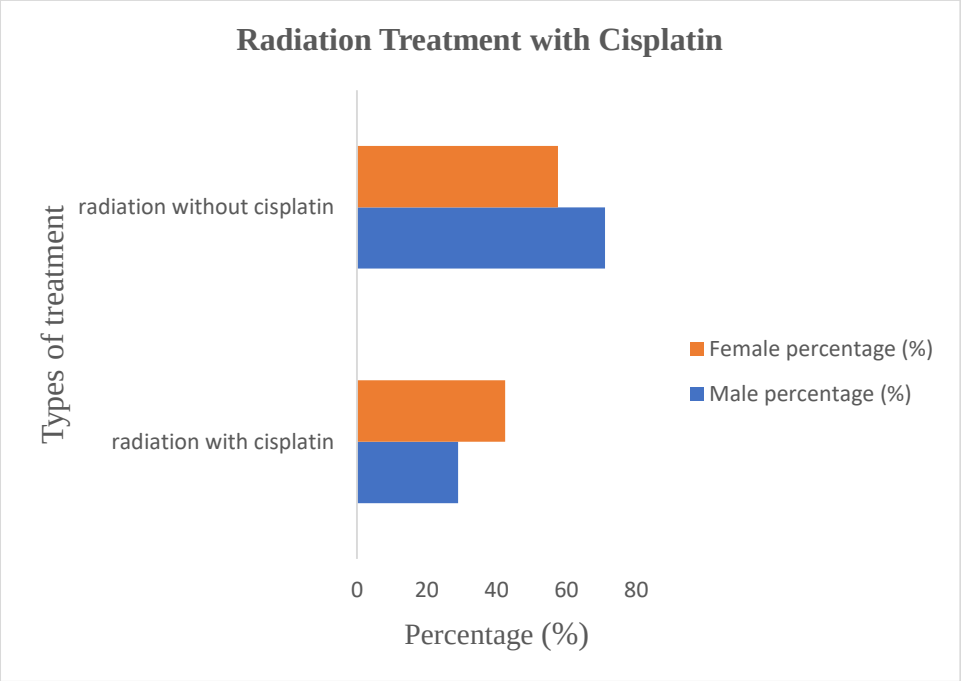

Figure 4Distribution of patients among chemo radiation treatment(n=350)

Table 5 -Shows distribution of performance status in patients with drug treatment based on gender, patients well tolerated is the most observed in our research with males – 98.62% and females 97.56% and patients died during treatment course in males are 1.37% and females are 2.43% due to progression of carcinoma. Patients well tolerated is on top in our research. It is depicted in **Figure5.** According to Silvijus et al., (2017) Cisplatin is responsible for a sizeable amount of adverse drug reactions (ADRs), in oncology and most of those ADRs are not preventable. Several probable mechanisms are proposed to explain the cisplatin-induced sudden cardiac death with hemodynamic collapse: an anaphylactic reaction, cardiotoxic event (atrial fibrillation, ventricular arrhythmias), electrolyte disorder (hypomagnesemia). The severe ADR could be a result of drug interaction. Hypersensitivity reactions to cisplatin have an overall incidence of 5% to 20%. Life-threatening cisplatin-induced hypersensitivity reactions are rare conditions that are difficult to foresee [(27)].

Table 5-Distribution of data of patients according to their performance status in duration of treatment(n=350)

Performance status	Male (n)	Male percentage (%)	Female (n)	Female percentage(%)
patients well tolerated	143	98.62	200	97.56
patients died during treatment course	2	1.37	5	2.43

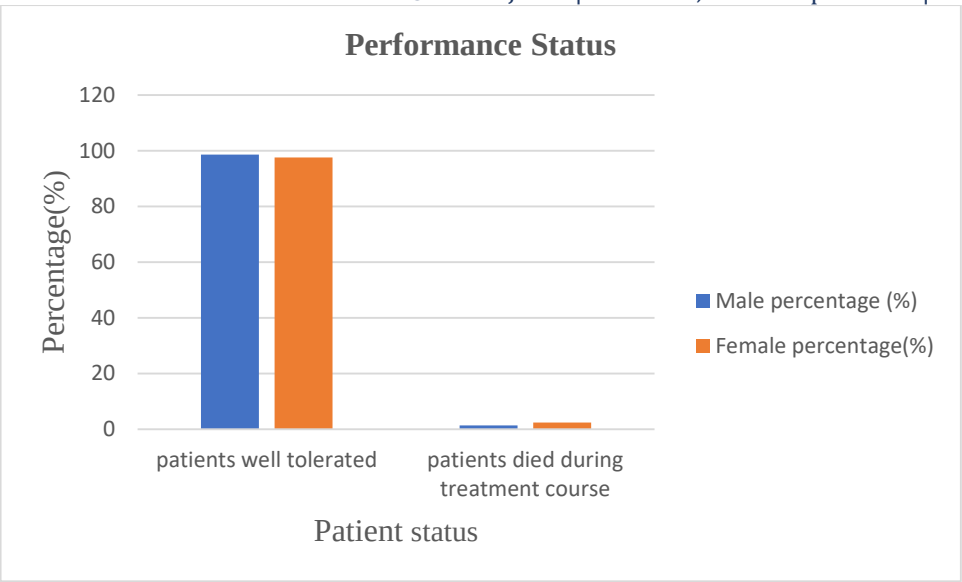

Figure 5: Distribution of data of patients according to their performance status in duration of treatment (n=350)

Table 6- shows distribution based on chemoradiation therapy, in this study the Radical RT, Adjuvant, Neoadjuvant were found to be in males – 55.17%, 17. 24%, 27.58% and in females found to be 57.07%, 20.97%, 2.1.95%. Radical RT is on top in our research. It is depicted in the **Figure6**. According to Tejal Gupta et al., (2009) Radical radiotherapy with concurrent chemotherapy is contemporary standard of care in the non-surgical management of these loco-regionally advanced cancers [(14)].

Table 6-Distribution of patients based on Chemoradiation plan(n=350)

Type of RT	Male (n)	Male percentage (%)	Female (n)	Female percentage (%)
radical RT	80	55.17	117	57.07
Adjuvant	25	17.24	43	20.97
neo adjuvant	40	27.58	45	21.95

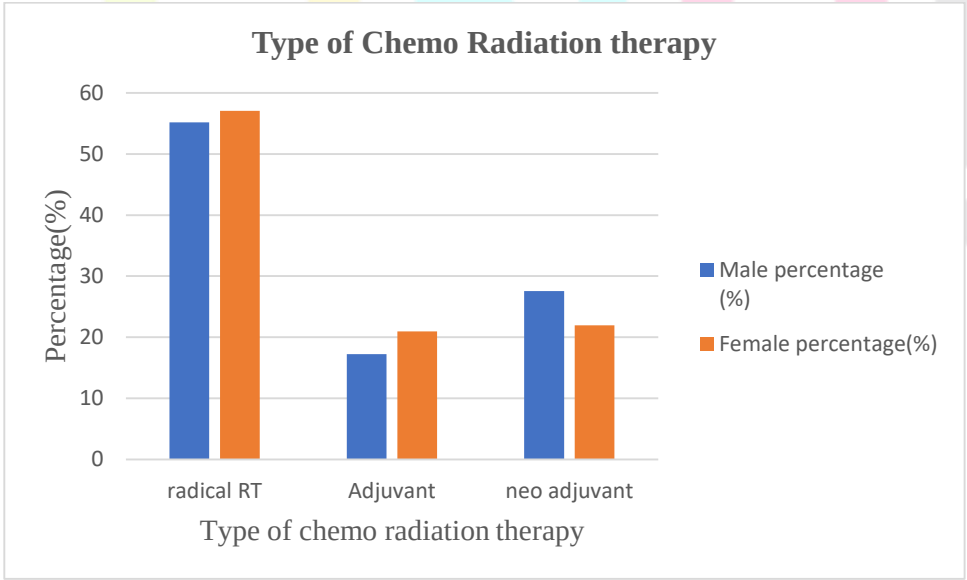

Figure 6: Distribution of patients based on chemoradiation plan

Table7- shows descriptive analysis combination of adverse drug reactions in patients based on gender. In this, we observed 13 types of combinations of ADR's. They were:

- Nausea + vomiting + weight loss + cough + Itching + Glossitis + Leukopenia+ Hyperpigmentation.
- Nausea + vomiting + Hyperpigmentation + cough + weight loss + Itching + Glossitis + Leukopenia + Nose bleed + Blurred vision + Nephrotoxicity + Ototoxicity.
- Nausea + vomiting + Diarrhoea + weight loss + Dyspnea + cough
- Ototoxicity + Nephrotoxicity + Dysphagia + Glossitis
- Nausea + Vomiting + Dysuria + haematuria + weight loss
- Nausea + cough + Dyspnea
- Headache + Nephrotoxicity + Nausea
- Constipation + Dryness of mouth + Hyperpigmentation
- Nausea + vomiting +Diarrhoea
- Nausea + vomiting + weight loss
- Nausea + vomiting
- Nausea + vomiting + Abdominal discomfort
- Nausea + vomiting + Abdominal discomfort + Itching.
- Plurality number of male patients has experienced Nausea + vomiting + weight loss + cough + Itching + Glossitis + leukopenia + Hyperpigmentation combination of Adverse Drug Reactions with percentage of 37.93%. The more no. of female patients has experienced Nausea + vomiting + Abdominal discomfort + Itching combination of Adverse Drug Reactions with percentage of 31.70%. It is depicted in **Figure7.**
- Patients often experienced adverse reactions after administration of cisplatin chemotherapy. In males 55 patients (37.93%) were experienced nausea, vomiting, weight loss, cough, itching at radiation administration, glossitis, decrease of white blood cell, and hyperpigmentation on radiation administered area.
- In females 65 patients (31.70%) experienced adverse reaction of nausea, vomiting, abdominal discomfort and itching on affected area.
- In this study, infrequent combination of adverse reaction experienced was nosebleed, blurred vision, nephrotoxicity, ototoxicity has the patient was administered 3 weekly cisplatin with 100mg/ml dose.
- After administration of cisplatin chemotherapy patients experienced increase of serum creatinine levels, in males 20 (13.79%), females 10 (4.8%) resulting in nephrotoxicity. According to Chun-yan fang et al., (2021) described patients who received a single dose of cisplatin may suffer from reversible kidney injury while large doses or multiple courses of treatment may cause irreversible renal failure [(28)].
- After administration of cisplatin over all complete blood picture varies from previous assumptions and decrease of leucocyte count has been detected. According to C F Pollera et al., (1987) studied increase of iron and ferritin levels and decrease of reticulocyte count and leucocytes [(29)].

Table 7: Distribution of patients among combination of adverse drug reactions(n=350)

Combination of adverse drug reactions experienced by patients	Male(n)	Male percentage (%)	Female(n)	Female percentage (%)
Nausea + vomiting + weight loss + cough + Itching + Glossitis + Leukopenia + Hyperpigmentation	55	37.93	6	2.92
Nausea + Vomiting + Hyperpigmentation + Cough + Weight loss + Itching + Glossitis + Leukopenia +	1	0.68	0	0

Nosebleed + Blurred vision + Nephrotoxicity + Ototoxicity				
Nausea + vomiting + Diarrhoea + weight loss + Dyspnoea + cough	26	17.93	13	6.34
Ototoxicity + Nephrotoxicity + Dysphagia + Glossitis	8	5.51	0	0
Nausea + vomiting + Dysuria + Haematuria + weight loss	3	06	4	1.95
cough + Nausea + Dyspnoea	5	3.44	6	2.92
Headache + Nephrotoxicity + Nausea	11	7.58	10	4.87
Constipation + Dryness of Mouth + Hyperpigmentation	8	5.51	7	3.41
Nausea + Diarrhoea+ vomiting	16	11.03	25	12.19
Nausea + Vomiting + Weight loss	9	6.20	25	12.19
Nausea + Vomiting	3	2.06	10	4.87
Nausea + Vomiting + Abdominal Discomfort	0	0	34	16.58
Nausea + Vomiting + Abdominal Discomfort + Itching	0	0	65	31.70

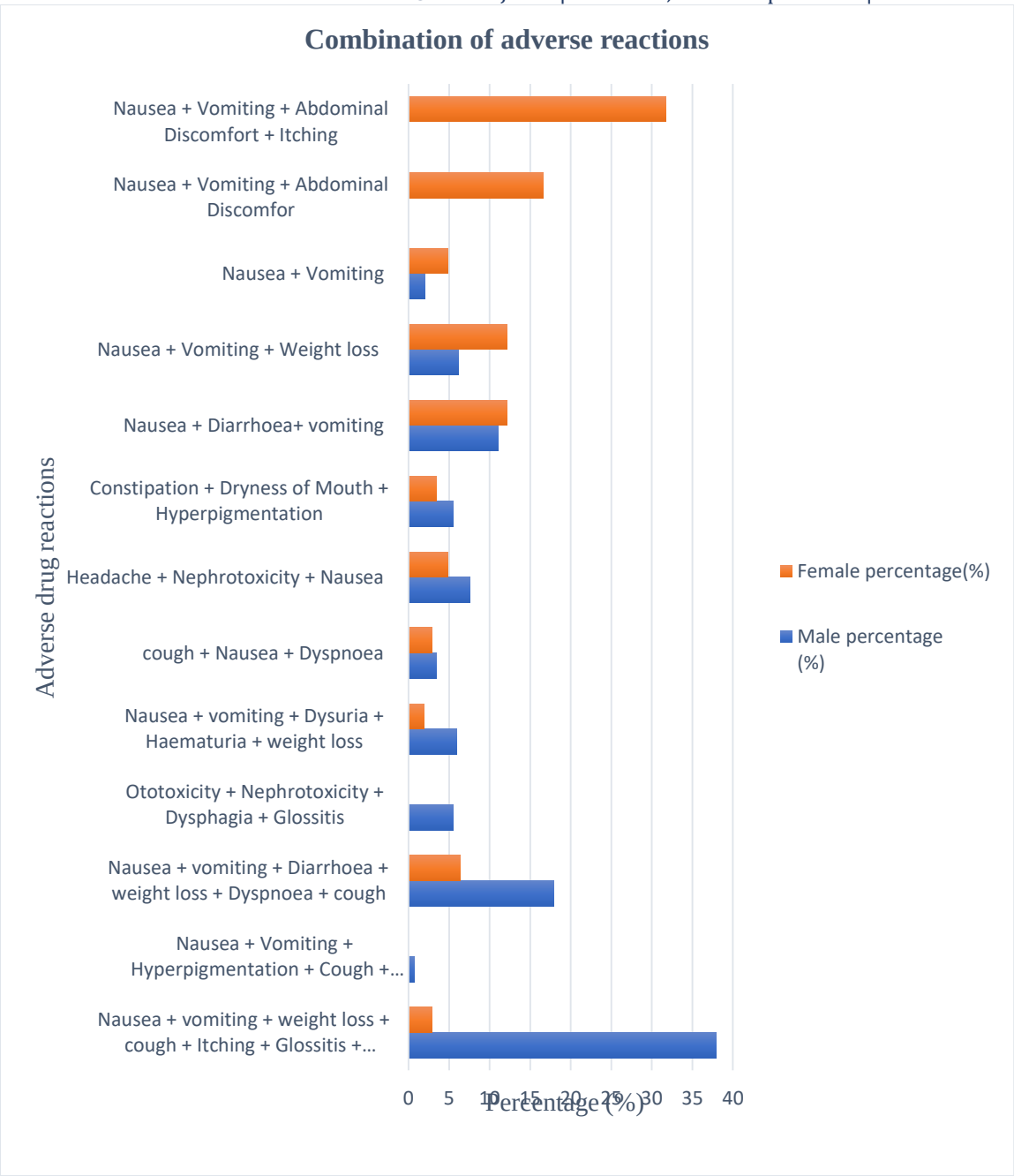

Figure 7: Distribution of patients among combination of adverse drug reactions (n=350)

Table8- describes about the diagnosis of cancer patients among study where majority division were cervical cancer patients with 43.90% in females and in male majority division found to be tongue cancer with percentage of 9.65%. it is depicted in **Figure8.** More number of females 90 (25.70%) are diagnosed with cervical cancer which can be caused by a human papilloma viral infection.

- In this study, preponderance female patients 114 (55.60%) diagnosed with gynaecological cancers. According to D Barman et al., (2002) cancer indicate that gynaecological cancers accounted for 30% of total cancers among women in India by the year 2020 [(30)].
- More number of males 97(96.06%) of all members have diagnosed with different head and neck cancers (carcinoma hard palate, Ca. floor of mouth, Ca. base of togue, Ca.buccal mucosa, Ca. vocal cord, ca. Tonsil, Ca. lower lip, Ca. hypopharynx, ca. oropharynx, Ca. nasopharynx, Ca, larynx, Ca. post cricoid, Ca. retromolar trigone, Ca. supra glottis, Ca. pyriform fossae, Ca. external auditory canal, Ca. alveoli) as they are habituated for smoking, and betel nut chewing while female 36 members(35.48%) are when compared to males.
- Males have more predictions for head and neck cancers due to more tobacco usage. In a study By K.T. Thimma Shetty et al., (2015) head and neck cancer are a major form of cancer in India accounting for 23% of oral cancer in males and 6% in females, 2/3rd of the oral cancer is prevalent in males whereas there is much variation in females.

Table 8: Distribution of patients among different types of diagnosis(n=350)

Cancer type	Male (n)	Male percentage	Female (n)	Female percentage
Ca. post cricoid	7	4.82	13	6.34
Ca. ovary	0	0	2	0.97
Ca. alveoli	3	2.06	1	0.48
Ca. liposarcoma	0	0	1	0.48
Ca. medulloblastoma	1	0.68	2	0.97
Ca. urinary bladder	2	1.37	0	0
Ca. retro molar trigone	2	1.37	0	0
Ca. gastro esophageal junction	3	2.06	2	0.97
Ca. breast	0	0	21	10.24
Ca. external auditory canal	1	0.68	1	0.48
Ca. supraglottis	7	4.28	0	0
Ca. Hodgkins lymphoma	3	2.06	1	0.48
Ca. non-Hodgkins's lymphoma	0	0	1	0.48
Ca. pyriform fossae	2	1.37	1	0.48
Ca. skin	0	0	1	0.48
Ca. endometrium	0	0	6	2.92
Ca. arteriovenous malformation	1	0.68	1	0.48
Ca. lung	12	8.27	3	1.46
Ca. thyroid	0	0	2	0.97
Ca. penis	1	0.68	0	0
Ca. rectum	8	5.51	4	1.95
Ca. anal canal	0	0	1	0.48
Ca. liver	0	0	1	0.48
Ca. colon	0	0	1	0.48
Ca. cervix	0	0	90	43.90
Ca. vagina	0	0	4	1.95
Ca. vulva	0	0	2	0.97
Ca. vault	0	0	12	5.85
Ca. tongue	14	9.65	2	0.97
Ca. base of tongue	3	2.06	0	0
Ca. buccal mucosa	11	7.58	5	2.43
Ca. vocal cord	7	4.82	0	0
Ca. tonsil	4	2.75	2	0.97
Ca. lower lip	1	0.68	0	0
Ca. pancreas	1	0.68	0	0
Ca. acute lymphocytic leukemia	1	0.68	0	0
Ca. hypopharynx	7	4.82	6	2.92
Ca. oropharynx	1	0.68	0	0
Ca. nasopharynx	3	2.06	0	0
Ca. larynx	8	5.51	0	0
Ca. esophagus	5	3.45	3	1.46
Ca. stomach	1	0.68	3	1.46
Ca. prostate	5	3.44	0	0

Ca. diffuse large B-cell lymphoma	1	0.68	0	0
Ca. floor of mouth	3	2.06	0	0
Ca. vertebral	1	0.68	0	0
Ca. hemangio blastoma	2	1.37	0	0
Ca. peri vascular epithelioid cell tumor	1	0.68	0	0
Ca. pleural effusion	2	1.37	1	0.48
Ca. superior vena cava syndrome	1	0.68	0	0
Ca. astrocytoma	3	2.06	5	2.43
Ca. inguinal region	2	1.37	1	0.48
Ca. lupus	0	0	1	0.48
Ca. para ganglioma	0	0	1	0.48
Ca. hard palate	1	0.68	0	0
Ca. papilliform	1	0.68	0	0
Ca. renal cell	1	0.68	0	0
Ca. multiple myeloma	1	0.68	0	0
Ca. glioma	0	0	1	0.48

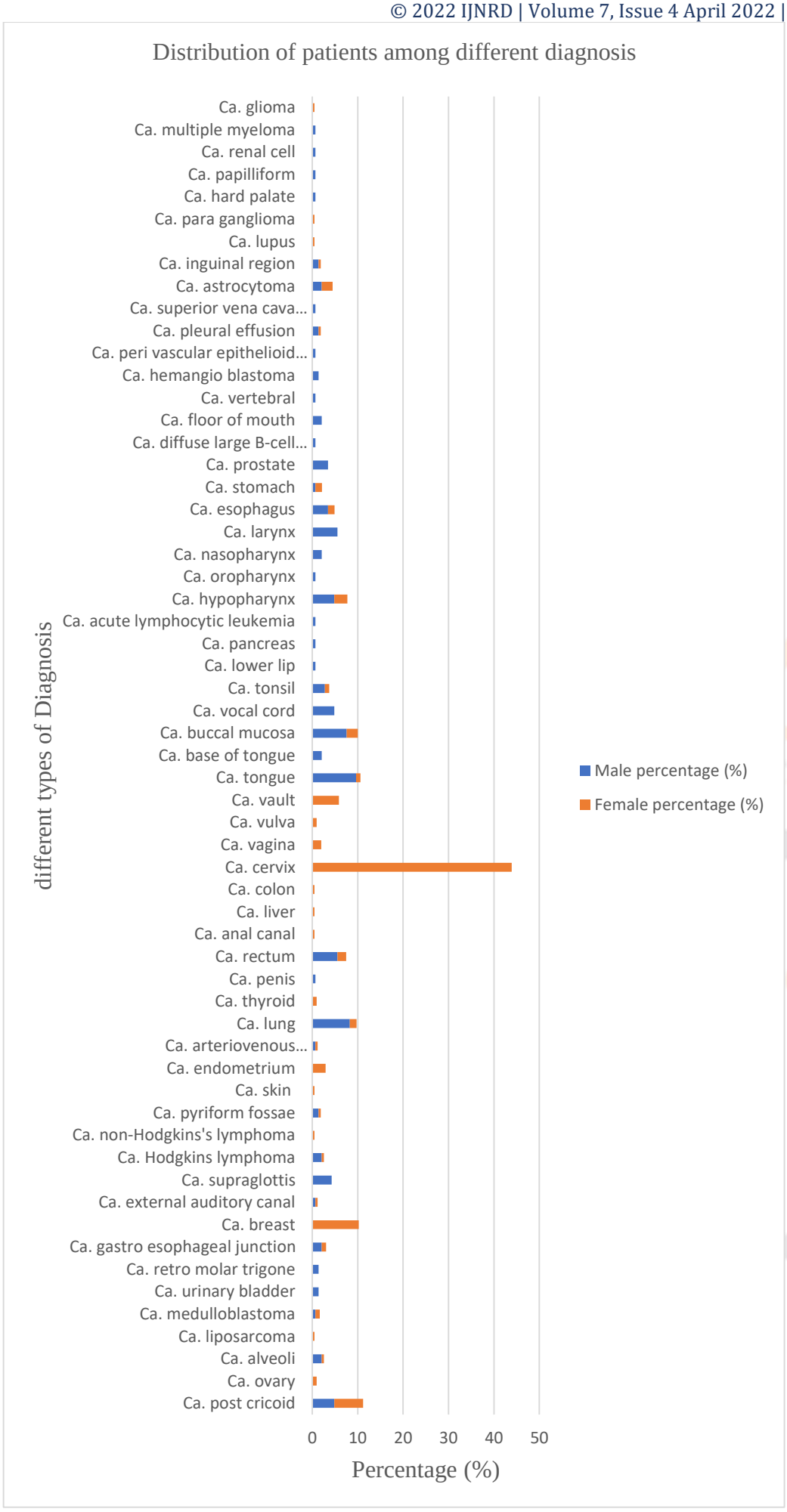

Figure 8: Distribution of patients among diagnosis

- Chemotherapy concurrent radiation therapy is recommended in locally advanced cancers of head and neck cancers and gynaecological cancers.
- Cisplatin is given as chemo therapy for locally advanced cancers as cisplatin increases effectiveness of the radiation.
- In this study patients are treated after surgery. Some patients with minimal risk are treated directly with concurrent chemo radiation.
- In this study all female patients having gynaecological cancers are after post-menopause. Breast cancer patients received only radiation after completion of chemotherapy cycles.
- Patients received radiation Monday to Friday daily with weekly once chemotherapy.

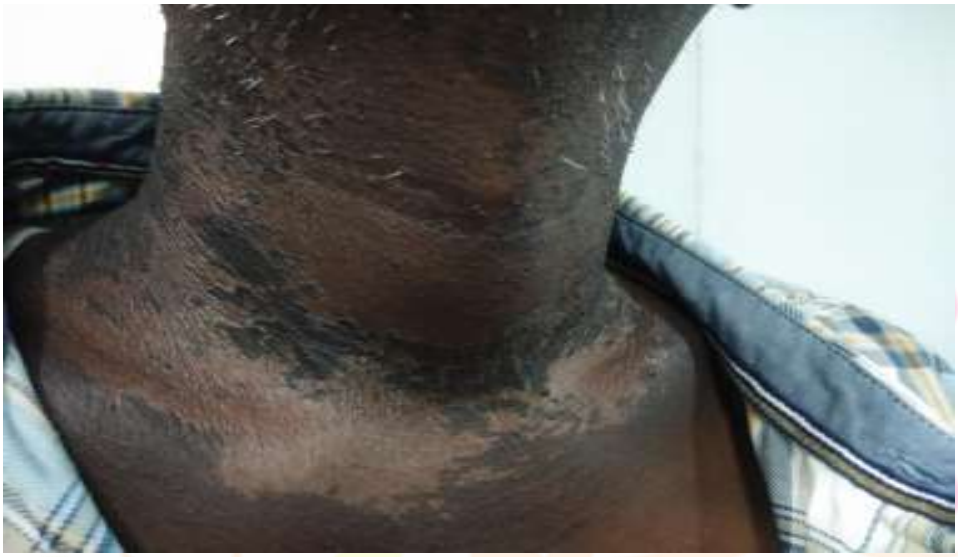

Figure9: Patient possess adverse reaction- hyperpigmentation and epicarp in duration of radiation treatment.

- In **Figure9.** patient possess adverse reaction – hyperpigmentation and epicarp in duration of radiation treatment. According to Reyes – Habito CM et al., (2014) radiation induced hyperpigmentation is limited to skin within the treatment field. The treated skin may be dark and have appearance of a tan. Dark skinned individuals and those treated with both chemotherapy and radiation therapy may experience more noticeable skin darkening [(31)].

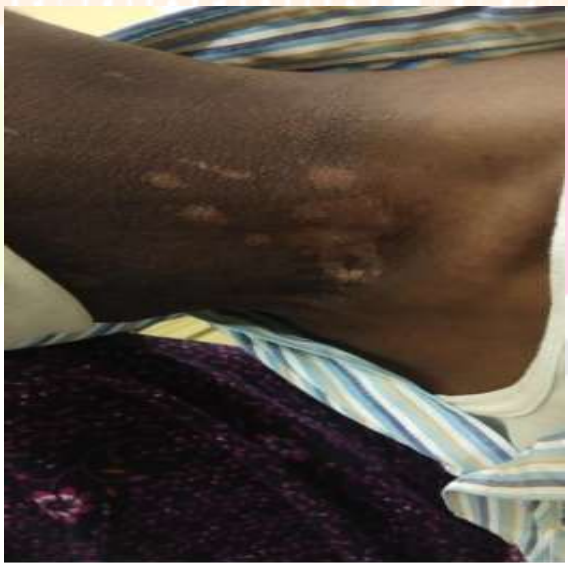

Figure10: Patient experienced adverse reaction- radiation dermatitis in duration of radiation treatment

- In **Figure10.** patient experienced adverse reaction – radiation dermatitis in duration of radiation treatment. In a study Bauer C et al., (2007) an estimated 95% of people who receive radiation therapy will have some form of radiation dermatitis including redness, skin peeling, skin dryness [(32)].
- In this present study, the planned chemoradiation therapy was completed in 98% of patients.
- All patients received complete treatment of chemoradiation therapy for their respective diagnosis.

- **Figure11.** Report the patient having macroglossia which is increase in growth of tongue, layers of tongue.
- **Figure12.** report the patient having neck node.
- **Figure13.** describes patient forbearing whitish sores located on tongue. The patient was diagnosed with carcinoma of tongue underwent 6 cycles of weekly cisplatin chemotherapy and daily basis of radiation therapy.
- Although patients experienced adverse reactions, they are manageable and recovered in mean time.
- Weekly administered patients and 3 weekly administered patients both experienced various adverse reactions. Patients with weekly administration do not experienced nosebleed where 3 weekly administer patient experienced.
- In this study patients well tolerated the treatment and showed good treatment response and appeared for next follow up. According to K T Robbins et al., (1994) concurrent chemoradiation therapy and targeted cisplatin can be safely delivered with high response rates and excellent loco-regional control in advanced stage III/IV head and neck squamous cell carcinoma [(33)].
- To decrease the incidence of cancers various immunization techniques are taking place.
- HPV vaccine can be given to girls and boys between ages 11 and 12years. Total 2 doses needed to be administered. This vaccine can prevent most cases of cervical cancer if the vaccine is given before girls or women exposed to virus. This vaccine can also prevent vaginal, vulvar cancer. According to Liqin Cheng et al., (2020) HPV vaccines significantly decreased HPV infection and HPV related diseases with the improvement in vaccine coverage and the introduction of pan – gender vaccination programmes, better protection against HPV infections and fewer HPV related cancer cases are expected [(34)].
- Patients with comorbidities like hypertension, diabetes are considered as risk and cisplatin administration is avoided and carboplatin is administered. According to L Cetina et al., (2006) chemoradiation based on cisplatin is the standard treatment for locally advanced head and neck cancer and gynaecological cancers, a subset of patients is either elderly or have comorbidities such as hypertension and diabetes these conditions may compromise administration of cisplatin. Weekly carboplatin concurrent radiation is well tolerated in locally advanced cancers [(35)].

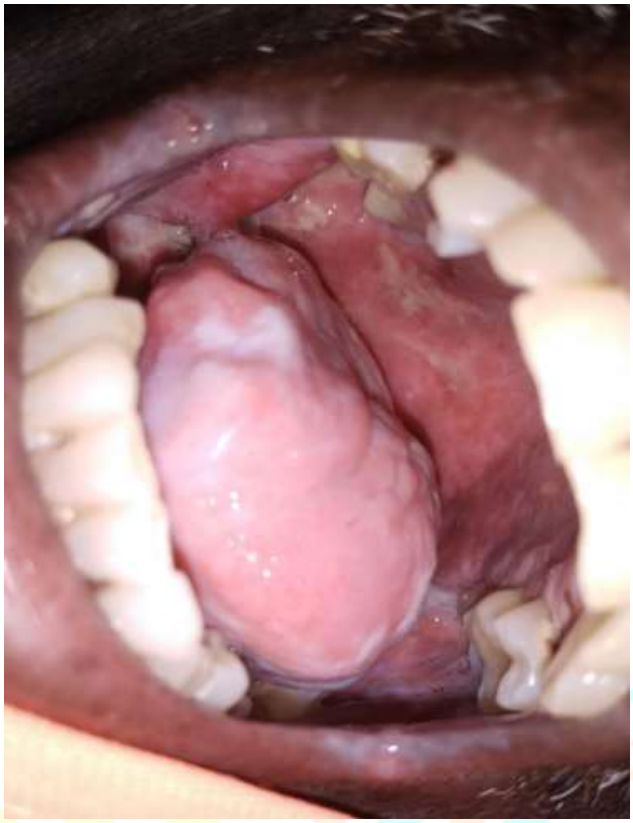

Figure 11: Patient having macroglossia-diagnosed with carcinoma of tongue.

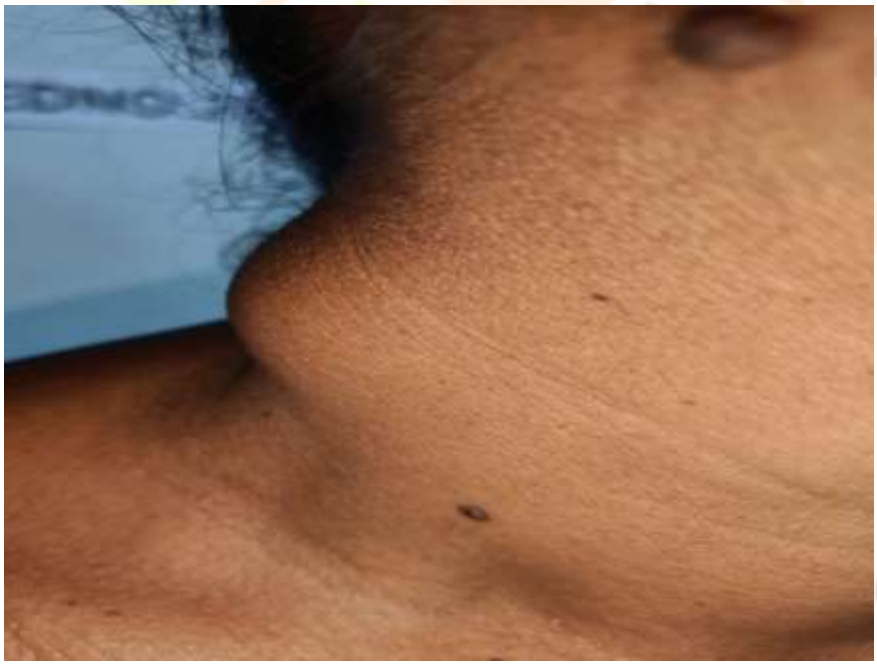

Figure12: Patient having neck node.

Figure13: Patient forbearing whitish sores located on tongue-diagnosed with carcinoma of tongue.

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CONCLUSION: Interpretation of this study shows importance of concurrent chemoradiation with weekly cisplatin at 50mg along with radiation therapy in contrasting cancer epitome with good complete response rates. The systematic and local toxicities were generally acceptable and manageable. Among 350 patients, 98.62% (male patients) and 97.56% (female patients) were well tolerated. 1.37% (male patients) and 97.56% (female patients) were died during the treatment course by progression of disease. Cisplatin concurrent radiation therapy improves the survival rates when compared to individual cisplatin or radiation therapy which also includes progression free survival among the patients with locally advanced cancers. Despite the fact that patients experiencing adverse reactions, which can be manageable and cisplatin combination radiation therapy can be count on various locally advanced cancers.

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