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# Histopathological study of thyroid carcinoma in Misan province

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**Abstract**

**Aims:** "Thyroid carcinoma is specific malignant tumors derived from follicle cells including papillary and follicular carcinoma, and parafollicular, calcitonin-producing C-cells (medullary carcinoma)". This study aimed to provide a present outlook on thyroid carcinoma among patients and investigation the relationship between the age, sex, and thyroid carcinoma in Missan province in Iraq. **Methods**: The data were collected in the period (First June – 2020 to Thirty November -2020) from (42) patients aged between (35 -80 or more) infected with thyroid carcinoma, a histopathological examination that performed and confirmed in the tissue sample obtained from the patients after surgical operations in AL-Sadder hospital in Missan province. **Results**: "The patients with thyroid carcinoma observed high incidence in ages between (41-55) years (42.8 %) cases, followed by the ages between (56-70) years (28.5 %) cases, while the lowest incidence observed in ages between (71or more) years (11.9%)cases. Thyroid carcinoma is observed more commonly found in females (64.28%) cases than the males (35.71%) cases ($P < 0.05$). Histopathological examination of the tissue specimens shows the commonest type of thyroid carcinoma was the papillary carcinoma" 28(66.6) cases characterized by multifocal with papillary architecture, changes in the size of thyrocytes with an abnormal nucleus and cytoplasm and shape, followed by follicular carcinomas 9(21.4) cases characterized by presence malignant epithelial cells arising from follicular cells and invasion into surrounding thyroid tissue, while the lowest type was Medullary carcinoma 5(11.9)cases, showing islands of tumor cells with central necrosis surrounded by vascular strom. **Conclusion:** "Papillary carcinoma is the most common malignant tumor of the thyroid gland and as compared with follicular carcinomas and medullary carcinoma. Proper implementation of preventive measures such as changing lifestyle factors might enhance control of thyroid carcinoma".

**Keywords:** "Thyroid carcinoma, papillary carcinoma, follicular carcinoma, medullary carcinoma, Missan province**".**

## Introduction

"According to the World Health Organization, classification malignant tumors of the thyroid subdivided into papillary, follicular and medullary carcinoma". A large portion of these diseases are of the papillary sort which is viewed as the most well-known threatening cancer of the organ in nations having iodine adequate or iodine-abundance eats fewer carbs and contains around 80-85% of thyroid malignancies. "Thyroid carcinoma was the eighth most frequently diagnosed cancer among females worldwide, accounting for approximately 3.5% of all the newly diagnosed cancer and more frequently than men in ratios of 2:1 to 4:1 and Papillary

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carcinomas occur in children and adolescents and reach their highest frequency during the middle decades of life" (Tataie,2003; Der Lin *et al*.,2010).

"Thyroid carcinomas were diagnosed frequently in individuals who had been treated with low-dose radiation to the head and neck for benign disease (hemangiomas, lymphangiomas, enlarged thymus, enlarged tonsils, and adenoids). After these reports, thyroid cancers (usually papillary) were recognized in survivors of the atomic bomb attacks on Japan at the end of World War II".

"Ionizing radiation is a well-documented risk factor for cancer. The thyroid may be irradiated more than other tissues because of its position in the body and its ability to concentrate iodine and the use of iodinated contrast agents increases the radiation absorbed by the thyroid by up to 35% because iodine blocks photons, increasing the local radiation energy" (Baker and Bhatti,2006; ACS,2019).

"Contaminants of Some industrialized food like nitrates can compete with iodine absorption by the thyroid and can behave as potential thyroid function disruptors and carcinogens. Nitrate is a frequent contaminant of drinking water in regions of the intense agricultural industry and is present at high levels in some vegetables and processed food". (Pellegriti et al, 2013)

"Papillary carcinoma represents 60-70% of all thyroid cancers in adults and around 70% in children and tends to remain localized in the thyroid gland and in time locally metastasizes to the cervical or upper meditational nodes. Papillary carcinoma head for to metastasize locally to lymph nodes, and sometimes make cystic structures nearby the thyroid that is difficult to detect because of the rarity of malignant tissue" (Al-Brahim and Asa,2006).

Follicular carcinoma addresses 15% of every single thyroid cancer and its recurrence is raised in iodine-insufficient regions in various nations. Follicular carcinoma happens in middle age to more seasoned people with some predominance in ladies; regardless of they can occur whenever of life. These cancers are normally found as a singular embodied thyroid knob with decay or pressure of the neighboring parenchyma; however, they can create in a thyroid organ with other prior conditions. "Most frequently the thyroid carcinoma is discovered accidentally by the patient or physician as a lump in the neck or maybe a fortuitous finding at the ultrasound of the neck. it may appear as a gradually enlarging, painful mass with associated symptoms of hoarseness, dysphagia or dysphonia, or there may be difficulty in breathing" (Mileva *et al*,2018).

This study was performed to investigate the relationship between age, sex, and thyroid carcinoma, and to detect the commonest type of thyroid cancer.

**Material and methods**

The information was collected in the period (First June – 2020 to Thirty November -2020) from (42) patients aged (35- to 80) suffering from thyroid carcinoma based on age, sex, and histopathological examination performed in the tissue sample obtained from the patients in AL-Sadder hospital in Missan province. The tissue tests were kept in Buffered Formaldehyde (10%) for a period (of 72) hours and from that point onward, the examples were treated by the Luna (1968) strategy for histopathological assessment and stained with Hematoxylin - Eosin stain

**The statistical analysis.**

The data were analyzed by using Chi-Square in ($P < 0.05$)

**Results**

High incidence of thyroid carcinoma has been seen in patients between (41-55) years old with (42.8%) of the total cases, followed by (28.5%) of total cases in patients (56-70) years old, while the lowest incidence rate (11.9%) in ages (71 years or more). (Figure1).

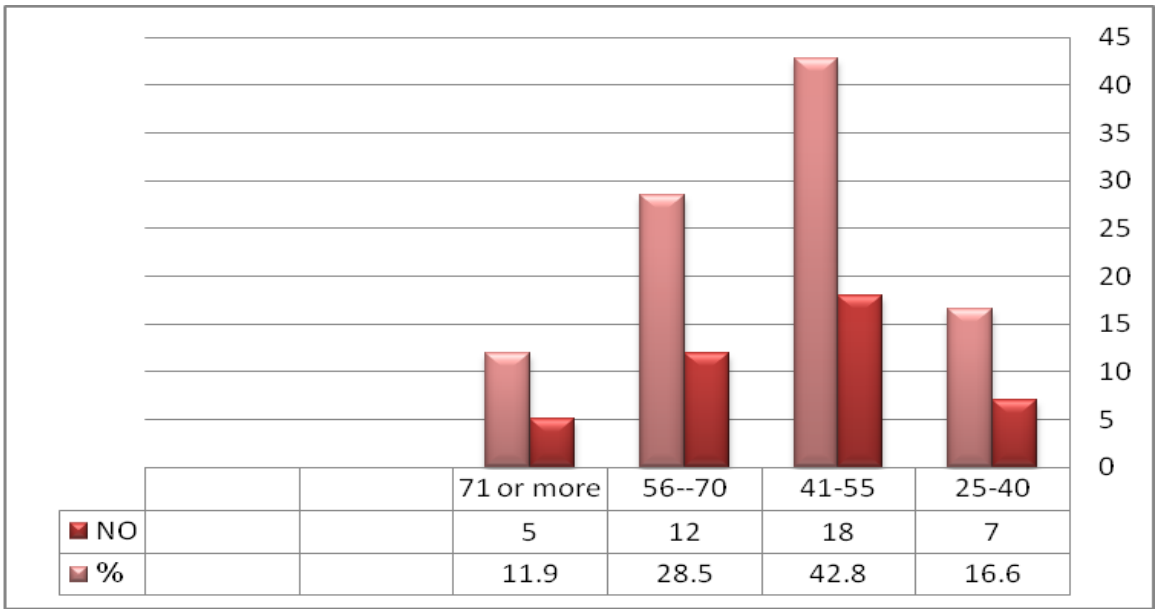


**Fig (1) showed the distribution of thyroid carcinoma among the patients based on ages**

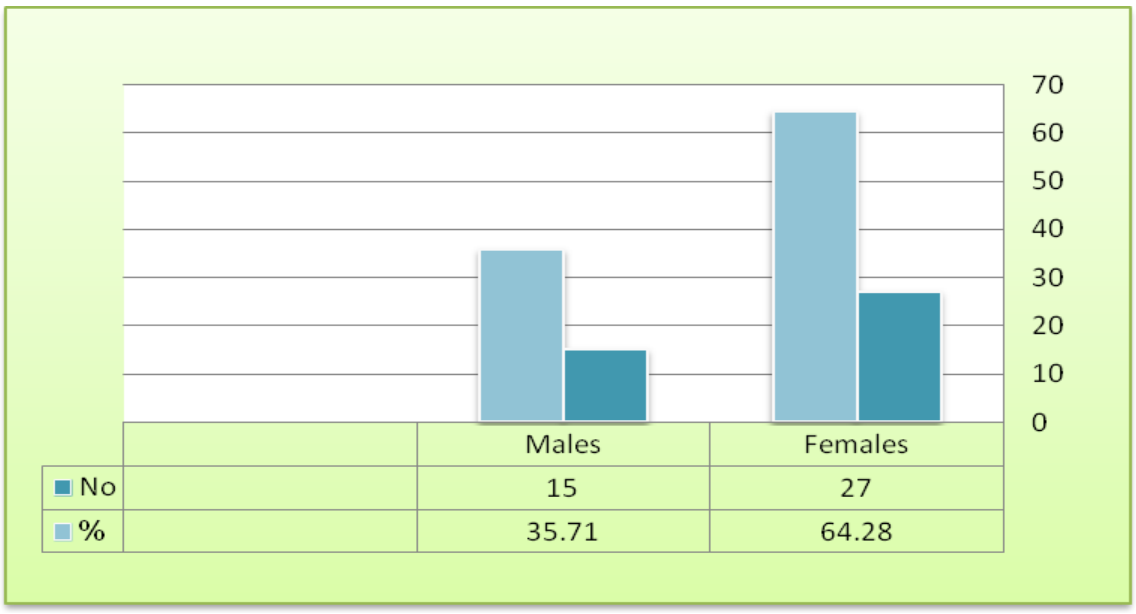


**Fig (2) shows the total number of male and females patients infected with thyroid carcinoma.**

A high percentage of the thyroid carcinoma was recorded in females (64.28%) cases, while the males recorded in percent (35.71%) cases of all patients as shown in (Figure 2).

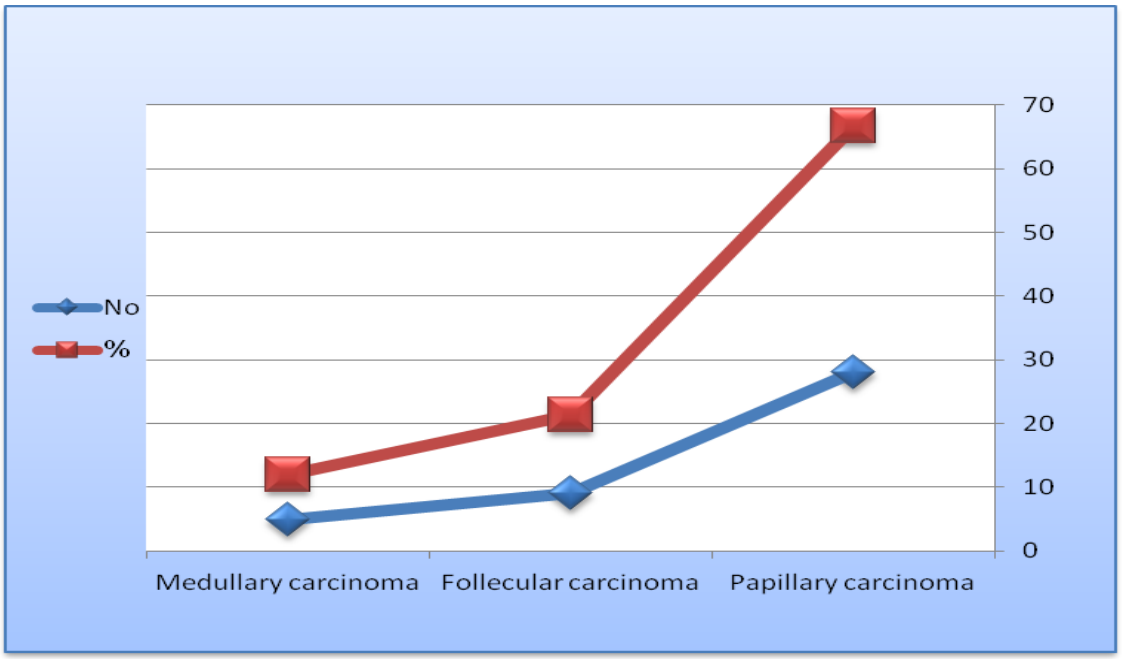


Fig (3) Show the commonest types of thyroid carcinoma observed in this study.

histopathological examination for the patients with thyroid carcinoma in the present study reveals that the predominant type of thyroid carcinoma was the papillary carcinoma represented by 28(66.6) cases, followed by follicular carcinomas represented by 9(21.4) cases, while the lowest type was Medullary carcinoma represented by 5(11.9), (Figure 3).

**Figure (4) Normal structure of thyroid gland: → Lobular septa, → Thyroid follicles, → colloid (HE.500). → cuboidal cells,**

"The thyroid gland according to the normal structure divided into lobules by septae dipping from the capsule, and the lobules consist of a large number of units called thyroid follicles which consider functional units of the thyroid gland. The thyroid follicle wall is composed of a large number of cuboidal cells called follicular cells responsible for the secretion of the thyroid hormone", fig (4).

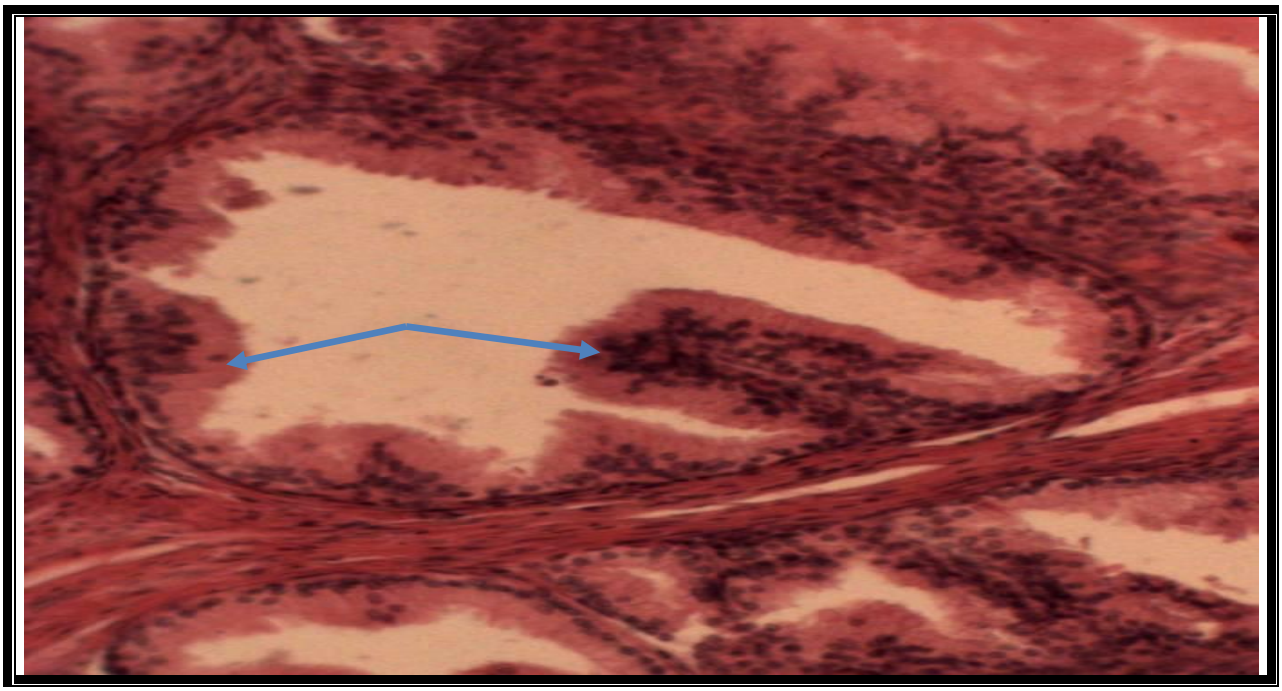

Figure (5): Showed papillary carcinoma in the thyroid gland characterized by the presence of multifocal complete or partial papillary → tumor cells growing to the lumen of the thyroid follicle, (HE.200).

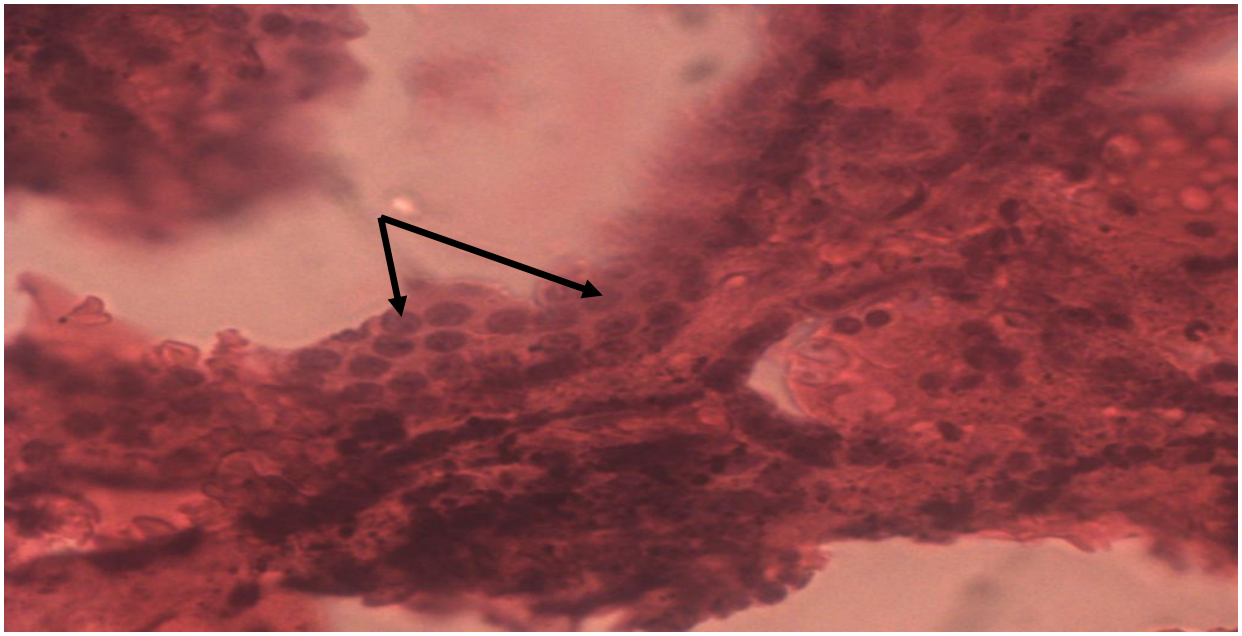

Figure (6): Papillary carcinoma in the thyroid gland revealed abnormal changes in thyrocytes → with enlargement of the nucleus and cytoplasm, (HE.400).

The results of histopathological examination for the patients with thyroid carcinoma through and after surgical operations observed that the papillary carcinoma the most common type is characterized by multifocal with complete or partial papillary architecture, changes in the size of thyrocytes with an abnormal nucleus, cytoplasm, and shape, fig (5,6).

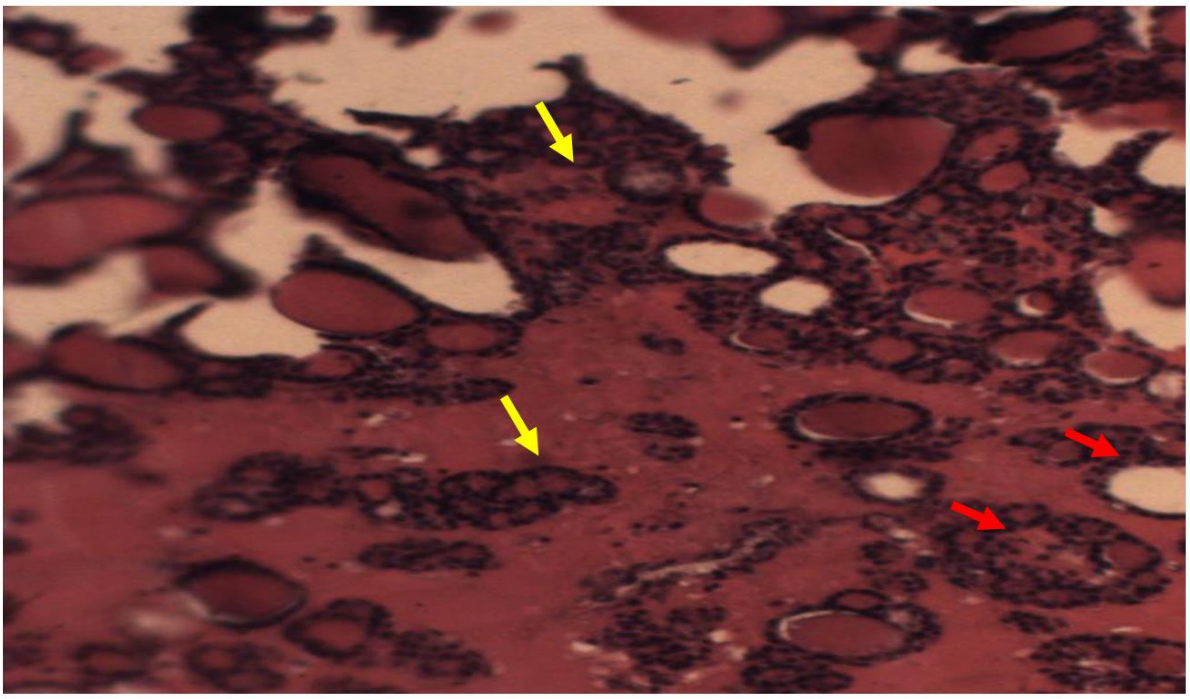

**Figure (7): Follicular carcinoma in the thyroid gland observed malignant epithelial cells → forming follicular architecture → surrounded by fibrovascular stroma (HE.200).**

Follicular carcinomas are represented by (21.4) of all cases of thyroid carcinoma in this study Which is characterized by the presence of malignant epithelial cells arising from follicular cells and seen invasion into surrounding thyroid tissue which appears in follicular architecture surrounded by fibrovascular stroma, fig (7).

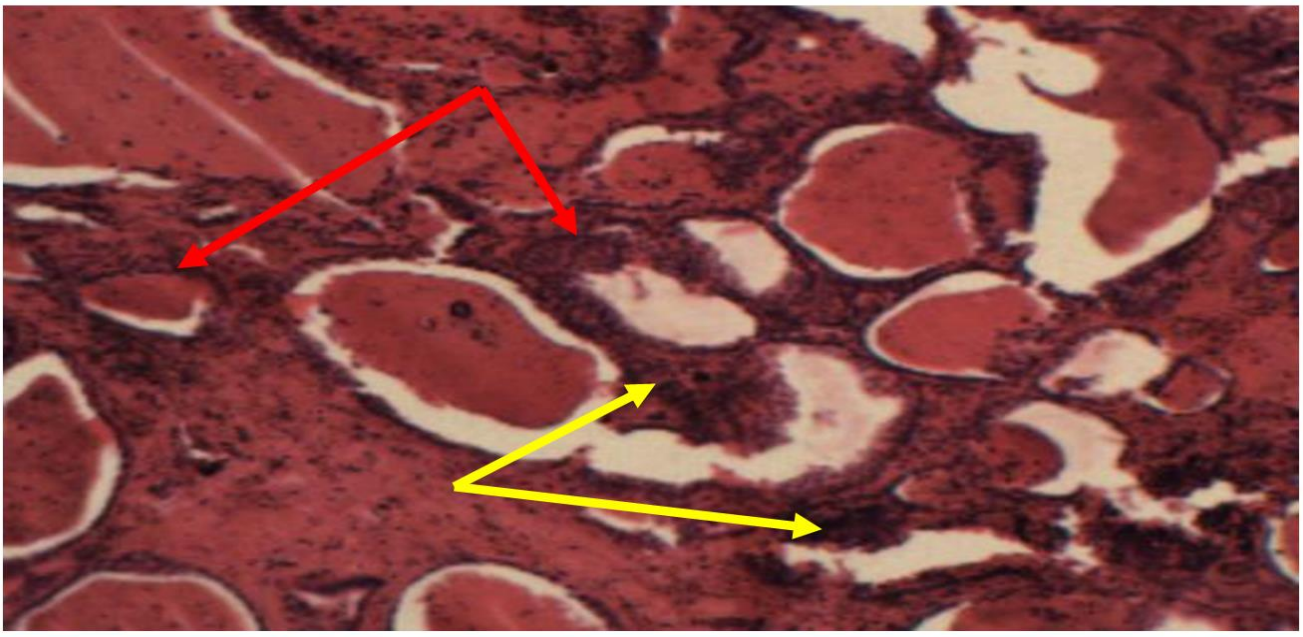

**Figure (8): Medullary carcinoma in thyroid gland showing islands of tumor cells → with central necrosis → (HE.200).**

Medullary carcinoma is represented by (11.9) of all cases of thyroid cancer in this study showing islands of tumor cells with central necrosis surrounded by vascular stroma, fig (8)

**Discussion**

The peak incidence of thyroid carcinoma has been seen in patients between (41-55) years old with (42.8%) of the total cases, followed by (28.5%) of total cases in patients (56-70) years old, while the lowest incidence rate (11.9%) in ages (71 years or more).

Shahid *et al* (2018) observed a "high incidence of thyroid carcinoma in patients of the age range of (31 – 40 years, 39 (39%), followed by patients of the age range of (41 –50) years31 (31%), while the lowest incidence recorded patients of the age range of" (50 -60) years4 (4%).

Sierra *et al* (2016) "reported that the thyroid cancer was the eighth most frequently detected cancer among females worldwide and represent approximately 3.5% of all detected cancer, whereas in males was less common and represented <1% of the total number of all diagnosed cancer. Females had 4–6 times higher incidence rates and 1–3 times higher mortality rates than males". In the study was performed by Zambudio *et al* (2004) "found about 89% of patients infected with thyroid carcinoma were female, which can be observed that multinodular goiter is seen frequently among female with a mean age around 40 years and is more common among adults of age 30 – 40 years".

"Sex hormones are thought to be responsible for the relatively high thyroid cancer incidence among females, particularly in their reproductive years and the relationship between sex hormones and thyroid remains unclear". "Evidence studies show that the clinical cases this prevalence are higher in women than in men (83% versus 17%), suggesting that women may undergo clinical investigations for thyroid disease more frequently than men" (Casella and Fusco, 2004).

Harach *et al* (2013). "Medical history of goiter or thyroid nodules is established risk factor for thyroid cancer in both women and men", "iodine deficiencies or excesses have been related to thyroid cancer".Histopathological examination of tissue samples shows that the commonest type of thyroid carcinoma was the papillary carcinoma, followed by follicular carcinomas, while the lowest type was medullary carcinoma.

Sillery *et al* (2009) "reported that the thyroid cancer can be classified histologically into papillary thyroid cancer (60–80%)", "follicular carcinoma (15–18%), anaplastic carcinoma (3–10%)", "medullary carcinoma (4–5%), lymphoma (5%), and metastases".

"Papillary carcinoma is the most common malignant tumor of the thyroid gland and comprises about 80–85% of thyroid malignancies with excellent prognosis (survival rates of 495% at 25 years), while the poor prognostic factors in papillary carcinoma include older age at diagnosis, male sex, large tumor size, and extrathyroidal growth". "Papillary carcinoma can occur at any age and rarely has been diagnosed as a congenital tumor most tumors are diagnosed in patients in the third to fifth decades of life" (LiVolsi, 2011).

"Grossly papillary carcinoma typically appears as an invasive tumor with poorly defined margins, and widely variable size, with a mean diameter of 2-3 cm. Three classification categories of papillary thyroid carcinoma based on the size and extent of the primary lesion". "Minimal carcinoma are 1.5 cm or smaller and show no evidence of invasiveness through the thyroid capsule or to cervical lymph nodes, intra-thyroid tumors are greater than 1.5 cm in diameter but remain confined to the thyroid gland with no evidence of extra-thyroid invasion, Xtra-thyroid tumors extend through the thyroid capsule to involve the surrounding viscera"(Limaim *et al*,2021).

"Follicular thyroid carcinoma is a tumor showing follicular cell differentiation and lacking the diagnostic nuclear features of papillary thyroid carcinoma, accounts for approx 15% of all thyroid tumors and its frequency is increased in iodine-deficient regions of the world, occur in middle age to older individuals with some predominance in women". "These tumors are usually found as a solitary encapsulated thyroid nodule with atrophy or

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compression of the neighboring parenchyma but may develop in a thyroid gland with other pre-existing conditions" (Pellegriti *et al*,2013).

Memon *et al*(2010) performed a study on 140 patients with thyroid carcinoma founds 15 "(7.6%)of those malignant cases were papillary carcinoma and 6 (75%) cases were follicular, while anaplastic carcinoma was found in 1(12.5%)" cases each.

Wani *et al* (2007) "found 108 patients of thyroid malignancy were studied for the pattern of the malignancy". "The commonest observed thyroid malignancy was papillary carcinoma (48.15%), followed by follicular carcinoma (37.04%), anaplastic carcinoma (7.41%), medullary carcinoma (5.55%), and malignant lymphoma (1.85%)".

The histopathological observations for the patients with thyroid carcinoma in this study revealed that the papillary carcinoma is characterized by multifocal with complete or partial papillary architecture and changes in the size of thyrocytes with abnormal nucleus and cytoplasm.

Carcangui *et al* (1985) described the papillary thyroid carcinomas are "the papillae and nuclear changes and the papillae are consists of a central fibrovascular stalk covered by a neoplastic epithelial lining. The papillae may be long, straight, and arranged in a parallel, regimented fashion. The thickness and composition of the papillary stalk are variable. The stalk is usually composed of loose connective tissue and differently sized thin-walled vessels".

LiVolsi (2011) "reported that the nuclei in case of papillary carcinoma are larger and more oval than normal follicular nuclei and contain hypo dense chromatin". "Although cleared nuclei are characteristic of papillary carcinoma, autoimmune thyroiditis, particularly Hashimoto's disease, often shows similar nuclear changes".

"Progressive infarction of the papilla and ensuing calcium deposition lead to lamellation. Psammoma bodies are usually present within the cores of papillae, in the tumor stroma, or lymphatic vessels, but not within the neoplastic follicles or colloid"(LiVolsi,1990).

Follicular carcinomas tissue samples in cases of thyroid carcinoma in this study were microscopically observed characterized by the presence of malignant epithelial cells arising from follicular cells and invasion into surrounding thyroid tissue which appears in follicular architecture surrounded by a fibrovascular stroma. Follicular carcinoma represents 15% of all thyroid tumors and its frequency is elevated in iodine-deficient areas in different countries. Follicular carcinoma occurs in middle age to older individuals with some dominance in women, despite they can happen at any time of life. These tumors are usually found as a solitary encapsulated thyroid nodule with atrophy or compression of the adjacent parenchyma, but they can develop in a thyroid gland with other preexisting conditions."Most frequently the thyroid carcinoma was discovered accidentally by the patient or physician as a lump in the neck or maybe a fortuitous finding at an ultrasound of the neck. it may appear as a gradually enlarging, painful mass with associated symptoms of hoarseness, dysphagia or dysphonia, or there may be difficulty in breathing" (Mileva *et al*,2018).

"Follicular neoplasm consists of high numbers of follicular cells, micro follicular arrangement, and scant or absent colloid. follicular adenomas are much more common than follicular carcinomas, occupying a histologic niche between follicular hyperplasia and follicular carcinoma, adenomas have no vascular or capsular invasion but otherwise have similar cytologic features (Simo˜es *et al*,2011)

"Microscopically, most follicular carcinomas are composed of fairly uniform cells forming small follicles of high cellularity containing scant colloid, but lacking the diagnostic features of papillary cancer, which has characteristic nuclear features and often contains psammoma bodies" (Goldstein *et al*,2002). "Follicular carcinoma consists of poorly differentiated cells with a characteristic solid infiltrating nestlike appearance (insulae), which

commonly contain necrosis, hemorrhage, and vascular invasion"(Sanders and Silverman,1998).

Medullary carcinomas were "found (11.9%) of all cases of thyroid cancer and characterized by islands of tumor cells with central necrosis surrounded by vascular stroma".

"Medullary carcinoma of the thyroid accounts for less than 15% of thyroid cancer and arises from the C cells of the thyroid gland responsible for s secretes calcitonin". "Medullary carcinoma is a rare neoplasm and is well known to be very aggressive and can metastasize to cervical and mediastinal lymph nodes, liver, bones, and lungs (and rarely brain) by the lymphovascular spread. It is in charge of 12-13% of all thyroid cancers and is usually found as a painless thyroid nodule" (Kanteti et al, 2020).

Medullary carcinoma may be due to either sporadic or hereditary reasons, the sporadic form of the tumor is much more commonly encountered and is in charge of 70% of all medullary carcinoma and the other 30% are due to gain of function germline mutations (Stamatakos et al,2011; Kushchayev *et al*,2019 ).

**In conclusion**, our observations suggest a relatively higher prevalence of "thyroid carcinoma in patients of the age range of (31 – 40 years, a high percentage of the thyroid carcinoma recorded in females as compared with the males' patients, papillary carcinoma is the most common malignant tumor of the thyroid gland and comprises about 66.6% of thyroid malignancies as compared with follicular carcinomas and medullary carcinoma".

**ETHICAL APPROVAL**

"Ethical approval was obtained from Al-Sadder Teaching Hospital and the study was performed in Department of Histopathology pathology, confidentiality was maintained throughout the research period".

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