International Journal of Medical Science and Clinical Invention 7(9): 4965-4967, 2020
DOI:10.18535/ijmsci/v7i09.05 ICV: 77.2
e-ISSN:2348-991X, p-ISSN: 2454-9576

Research Article,

Expression of Matrix Metalloproteinases in Thyroid Follicular Neoplasm Fnab

Meta Zulyati Oktora[1], Anandia Putriyuni[2]

[1,2]Department of Pathology Anatomic, Faculty of Medicine, Baiturrahmah University, Padang, Indonesia.

Abstract:

Fine-Needle Aspiration Biopsy (FNAB) thyroid nodules are difficult to distinguish between follicular malignancy and follicular benign lesions. Matrix Metalloproteinase 9 (MMP-9) examinations can be added to help to make an initial diagnosis. This study aims to examine the MMP-9 expression of thyroid follicular neoplasm FNAB. This study was an observational study using a cross-sectional study method consisting of 42 FNAB samples that were diagnosed with follicular neoplasms at M. Djamil Hospital Padang, West Sumatera in 2016-2017. This study found that MMP 9 stain was 80.9% positive in thyroid follicular nodules diagnosed by FNAB

Key words: Fine-Needle Aspiration Biopsy (FNAB), Follicular neoplasm thyroid, MMP-9

Introduction:

Fine-Needle Aspiration Biopsy (FNAB) thyroid nodules are difficult to distinguish between follicular malignancy and follicular benign lesions (1). The diagnosis of malignancy can only be made from histopathology examination by examing tumor invasion to the capsule and vascular (2,3). Matrix Metalloproteinase 9 (MMP-9) examinations can be added to help to make an initial diagnosis. MMP-9 is a proteolytic enzyme that plays important role in cancer progressivity, especially in the thyroid. High MMP-9 expression will lead to earlier degradation of the thyroid and it will make the cell metastasis easier (4). This study aims to examine the MMP-9 expression of thyroid follicular neoplasm FNAB. We used 42 samples of follicular thyroid neoplasm FNAB obtained from the Pathology Anatomic laboratories in RSUP M Djamil Padang, West Sumatera. The immunocytochemical was staining with primary antibody MMP-9 then its expression was assessed in the stroma and cytoplasmic tumor. In this study FNAB, follicular thyroid nodules were found in the age group 21-45 years old (57.1%), women (88.1%), and MMP-9 expression was found as much as 80.9%.

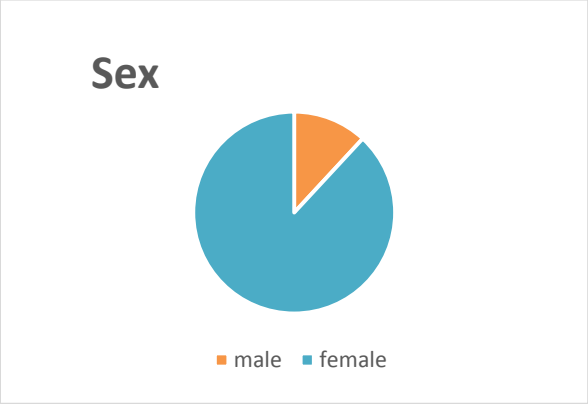

Figure 1. The Proportion of Patients by Sex

Procedures and Methods:

This study was an observational study using a cross-sectional study method consisting of 42 FNAB samples that were diagnosed with follicular neoplasms at M. Djamil Hospital Padang, West Sumatera in 2016-2017. The preparations are reviewed and representative preparations will be stained with MMP-9 antibodies. Immunocytochemical staining has been carried out in the Anatomy Pathology laboratories of Dr. RSUP. Cipto Mangunkusumo, Jakarta. We used primary antibody MMP-9 rabbit monoclonal

(*Dual Endogenous Enzyme Block, Labelled Polymer-HRP*, DAB + Substar buffer dan DAB + *Chromogen*, PB*)* then its expression is assessed in the stroma and cytoplasmic tumor. And preparations have been analyzed at the Baiturrahmah Faculty of Medicine.

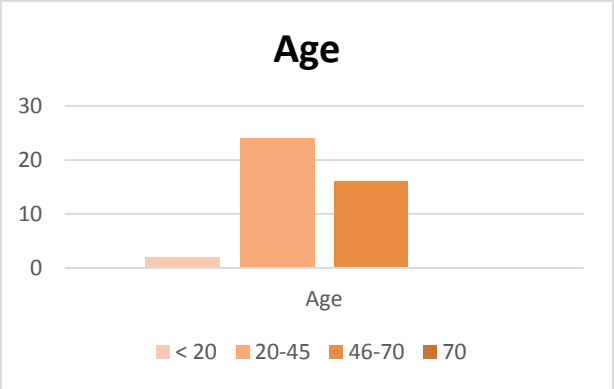

Figure 2. The Proportion of Patients by Age

Result:

There were 53 cases of follicular neoplasm with 42 cases diagnosed based on Bethesda and used as research samples, consisting of 5 men (11.9 %) and 37 women (88,1%) (Figure 1). This study showed that the mean age of patients was 41 years old, with the minimum age was 17 years old, and the maximum age was 63 years old. The proportion of patients based on age, divided into 4 age groups, including <20 years old, 21-45 years old, 46-70 years old, and > 70 years old. The results of this study showed that there were 2 (4,8%) patients of <20 years old, 24 (57,1%) patients of 21-45 years old, 16 (38,1%) patients of 46-70 years old, and 0 patients of > 70 years old (Figure 2).

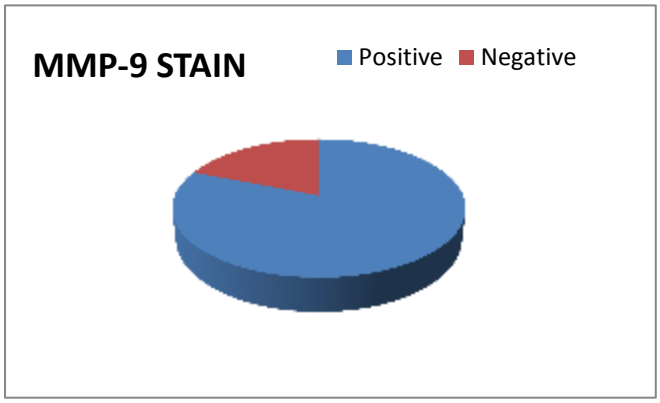

Figure 3. The Proportion of Patients by MMP-9 stain

In this study, 34 cases (80.9%) of the thyroid follicular neoplasm stained with MMP-9 were obtained (Figure 3). The FNAB and immunocytology stain of thyroid follicular neoplasm FNAB can be seen in Figures 4 and 5.

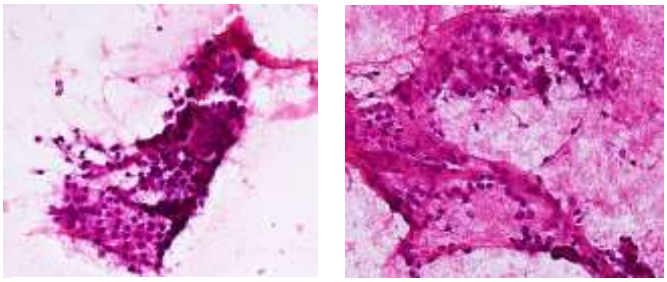

Figure 4. Microscopic of thyroid follicular neoplasm FNAB with H&E stain (100x and 200x)

Figure 5. Microscopic of thyroid follicular neoplasm FNAB were positive with MMP-9 stain

Discussion:

The study consisted of 42 cases diagnosed based on FNAB of thyroid follicular neoplasm including 88.1% women and 11.9% men. The same as a study Lim Hyeyeun ET all in the United States (1974-2013) there were 97% (77.276) cases of thyroid cancer diagnosed in women (5). The higher thyroid nodule found in women than men is often associated with the role of female sex hormone factors, although until now through epidemiological studies this has not been proven. The role of female sex hormones that has been widely studied is the role of estrogen in the well-differentiated carcinogenesis of thyroid carcinoma. Estrogen has a proliferative effect on papillary thyroid carcinoma in vitro, but where there is cell proliferation that is mediated by the α (erα) estrogen receptor, there will be an inhibitory effect by the β estrogen receptor (erβ). These findings also prove that estrogen is involved in the differentiation process of thyroid carcinoma (6). The role of hormonal factors in thyroid carcinogenesis became clearer after it was discovered that pregnancy increases the risk of thyroid carcinoma due to increased thyroid hormones and serum estrogen levels (7). This

study showed that the mean age of patients was 41 years old, with the minimum age was 17 years, and the maximum age was 63 years. The results of this study showed that there were 2 (4,8%) patients of <20 years old, 24 (57,1%) patients of 21-45 years old, 16 (38,1%) patients of 46-70 years old, and no patients of > 70 years old. Savafi Ali, 2017 in Iran found that the highest rate of prevalence in thyroid cancer was observed at the age of 45 years at the time of diagnosis (8). Along with the aging process, cells will undergo DNA mutations including mitochondrial DNA which can increase the production of free radicals (ROS). The oxidative damage cycle that instructs ROS will play a direct role in the initiation of carcinogenesis and increase the potential for metastatic tumors (9). Fine needle aspiration biopsy (FNAB) is important in evaluating thyroid nodule patients, reducing unnecessary surgery in patients with benign nodules, proper interpretation, and therapy for patients with malignant nodules. Agcaoglu et al reported that the factors that can determine the success of thyroid FNAB and reduce false-negative scores are the expertise of cytopathologists (10). Metalloproteinase matrix is also used as a marker of the progression of malignancy. MMP can play an important role in the process of carcinogenesis, invasive cell tumors penetrate the basement membrane to the stroma and metastases (4,11). In this study, 34 cases (80.9%) of the thyroid follicular neoplasm stained with MMP-9 were obtained. The expression of MMP-9 stains positively on the cytoplasm and cell membrane with varying intensities. The authors hope this research can be continued by finding and assessing its histopathological tissue.

Conclusion:

This study found that MMP 9 stain was 80.9% positive in thyroid follicular nodules diagnosed by FNAB

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