ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 06 | June - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

IMMUNOHISTOCHEMICAL EXPRESSION OF GALECTIN -3 MARKER IN THYROID LESIONS

Pathology

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KEYWORDS

AIMS AND OBJECTIVES

1. To study the expression of Galectin-3 in histologically proven cases of benign and malignant thyroid lesions.
2. To compare and evaluate the expression of Galectin-3 with histological diagnosis.

MATERIAL AND METHODS

The present study will be conducted on 50 thyroidectomy specimens received as surgically resected thyroid tissue or retrieved from the department of Pathology, Govt. Medical College, Amritsar. The relevant clinical history, family history, investigations and gross examination will be recorded according to the proforma attached. The tissue will be formalin fixed and paraffin embedded and then stained for routine haematoxylin and eosin and diagnosed. Then immunohistochemical study for Galactin-3 will be done. Thereafter, the scoring will be done and results will be compared and analysed.

Inclusion Criteria:

Cases of thyroid received as thyroidectomy specimens which will be processed and sections stained with H & E and histologically reported as Benign or Malignant lesions irrespective of age, sex and region will be included in the study.

Exclusion Criteria:

Inadequate specimens of thyroid will be excluded from the study.

Results And Interpretation Of Ihc Staining:

Positive control tissue were having brown coloured end product at site of target antigen. Negative control sections were not having the above colour since there was no antigen antibody reaction.If the test showed positivity in the form of specific colour it meant tissue was having antibody specific antigen.

Ihc Scoring

Qualitative scoring:
Score 0 = No staining
Score 1+ = Weak/focal and light brown staining
Score 2+ = Moderate and brown staining in majority of cells
Score 3+ = Strong and dark brown staining in majority of cells

Quantitative scoring:

Score 0	=	No staining
Score 1+	=	Positively stained cells <5%
Score 2+	=	Positively stained cells 5-10%
Score 3+	=	Positively stained cells 11-50%
Score 4+	=	Positively stained cells >50%

Histopathological diagnosis was correlated with immuno histochemistry and sensitivity, specificity, positive predictive value and negative predictive values were calculated.

RESULTS

Nature Of Lesion On Histopathology (n=50)

Nature	No. of cases	Percentage (%)
Benign	31	62.0
Malignant	19	38.0
Total	50	100.0

Histopathological Types Of Thyroid Lesions (n=50)

Histopathological diagnosis	No. of cases	Percentage (%)	
Benign			
1.	Adenomatous goitre	14	28
2.	Follicular adenoma	08	16
3.	Hashimotos thyroiditis	04	08
4.	Lymphocytic thyroiditis	03	06
5.	Hurthle cell adenoma	02	04
Malignant			
1.	Papillary carcinoma	13	26
2.	Follicular carcinoma	04	08
3.	Medullary carcinoma	01	02
4.	Anaplastic carcinoma	01	02
	Total	50	100

Variants Of Papillary Carcinoma Thyroid (n=13)

Variant	No. of cases	Percentage (%)
Classical papillary carcinoma	06	46.15
Follicular variant of papillary carcinoma	05	38.5
Solid variant of papillary carcinoma	02	15.4
Total	13	100

Galectin- 3 Expression In Thyroid Lesions (n=50)

Galectin-3 expression	No. of cases	Percentage (%)
Positive	19	38.0
Negative	31	62.0
Total	50	100.0

Galectin- 3 Expression In Benign Thyroid Lesions (n=31)

Galectin-3 expression	No. of cases	Percentage (%)
Positive	03	09.68
Negative	28	90.32
Total	31	100.0

Galectin- 3 Expression In Malignant Thyroid Lesions (n=19)

Galectin-3 expression	No. of cases	Percentage (%)
Positive	16	84.21
Negative	03	15.79
Total	19	100.0

Qualitative Scoring Of Immunohistochemical Expression Of Galectin-3 (n=50)

Histpathological diagnosis	Total cases	Number of cases with scoring				Total positives	Percentage of positives (%)
		0	1+	2+	3+		
Papillary carcinoma	13	01	00	03	09	12	92.30
Follicular carcinoma	04	01	01	02	00	03	75.0
Medullary carcinoma	01	01	00	00	00	00	00.0
Anaplastic carcinoma	01	00	00	01	00	01	100.0

Follicular adenoma	08	07	00	01	00	01	12.50
Adenomatous goitre	14	13	00	01	00	01	7.14
Hashimotos thyroiditis	04	04	00	00	00	00	0.0
Lymphocytic thyroiditis	03	03	00	00	00	00	0.0
Hurthle cell adenoma	02	01	00	01	00	01	50.0
Total	50	31	01	09	09	19	

Qualitative Scoring Of Immunohistochemical Expression Of Galectin-3 In Variants Of Papillary Carcinoma Of Thyroid (n=13)

Variant	No. of cases	No. of cases with scoring				Total no. of positive cases	Percentage of positive cases (%)
		0	1+	2+	3+		
Classical papillary carcinoma	06	00	00	00	06	06	100.0
Follicular variant of papillary carcinoma	05	01	00	01	03	04	80.0
Solid variant of papillary carcinoma	02	00	00	02	00	02	100.0
Total	13	01	00	03	09	12	92.30

Quantitative Scoring Of Immunohistochemical Staining Of Galectin-3 (n=50)

Histopathological diagnosis	Total cases	No. of cases					Total positives	Percentage of positives (%)
		0	1+	2+	3+	4+		
Papillary carcinoma	13	01	00	03	06	03	12	92.30
Follicular carcinoma	04	01	01	01	01	00	03	75.0
Medullary carcinoma	01	01	00	00	00	00	00	00.0
Anaplastic carcinoma	01	00	00	00	00	01	01	100.0
Follicular adenoma	08	07	00	01	00	00	01	12.50
Adenomatous goitre	14	13	00	01	00	00	01	7.14
Hashimotos thyroiditis	04	04	00	00	00	00	00	00.0
Lymphoctic thyroiditis	03	03	00	00	00	00	00	0.0
Hurthle cell adenoma	02	01	00	01	00	00	01	50.0
Total	50	31	01	07	07	04	19	

Quantitative Scoring Of Immunohistochemical Expression Of Galectin-3 In Variants Of Papillary Carcinoma Of Thyroid (n=13)

Variant	No. of cases	No. of cases with scoring					Total no. of positive cases	Percentage of positive cases (%)
		0	1+	2+	3+	4+		
Classical papillary carcinoma	06	00	00	00	03	03	06	100.0
Follicular variant of papillary carcinoma	05	01	00	01	03	00	04	80.0
Solid variant of papillary carcinoma	02	00	00	02	00	00	02	100.0
Total	13	01	00	03	06	03	12	92.30

Statistical Analysis Of Galectin-3 Immunoexpression

Variable	Galectin-3 (%)
Sensitivity	84.21
Specificity	90.32
Positive predictive value	84.21
Negative predictive value	90.32

DISCUSSION

Comparison Of Immunohistochemical Expression Of Galectin-3 In Malignant Thyroid Lesions

Author/year	Papillary carcinoma	Follicular carcinoma	Anaplastic Carcinoma	Medullary carcinoma
Xu et al [1]/ 1995	100.0% (16/16)	100.0% (7/7)	_	37.5% (3/8)
Kovacs et al [2] /2003	100% (20/20)	70% (7/10)	_	80% (4/5)
Magdalena et al [3]/ 2003	_	85.71% (36/42)	_	_
Kedem et al [4]/2004	83.33% (15/18)	63.3% (7/11)	_	_
Segura et al [5]/2005	100% (14/14)	81.0% (18/22)	_	_
Carpi et al [6]/2006	91.67% (11/12)	_	_	_
Park et al [7] /2007	98.9% (179/181)	64.0% (16/25)	_	_
Rydlova et al [8]/2008	100% (12/12)	58.3% (7/12)	_	_
Saleh et al [9]/ 2010	87.5% (28/32)	81.80% (18/22)	_	_
Manivannan et al [10] /2012	100% (7/7)	100% (3/3)	_	_
Maghrabi et al [11] /2013	92.10% (35/38)	40% (2/5)	_	_
Present study	92.30% (12/13)	75% (3/4)	100% (1/1)	0% (0/1)

In this study, Galectin-3 was specifically expressed by malignant neoplasms, showing that this molecule could be used as an adequate marker for malignant follicular cells. Our results as well as those of the vast majority of researchers confirmed that galectin-3 is an excellent marker for supporting the diagnosis of papillary thyroid carcinoma and for distinguishing malignant from benign or hyperplasic lesions when the morphologic criteria are equivocal.

Strong (3+) positivity for galectin-3 is almost characteristic for papillary carcinoma and the presence of strong diffuse staining (3+) is very suggestive of papillary carcinoma.

CONCLUSION

Thus data demonstrates that negative staining for Galectin-3 does not exclude papillary carcinoma in those cases and the presence of strong diffuse staining is very suggestive of papillary carcinoma.

Therefore, Galectin-3 may serve as marker for thyroid malignancy and may have significant impact clinically because no other method for differentiating between benign and malignant thyroid lesions currently exists other than thyroidectomy followed by histological examination of the involved tissue. So, immunohistochemical staining with Galectin-3 provides information which allows a more rational decision between medical management and unnecessary surgical intervention.

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