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RESEARCH ARTICLE

Histopathology - Immunohistochemistry correlation: three Years' Experience in a rural based tertiary care hospital

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Abstract

Context: Immunohistochemistry (IHC) is regarded as confirmatory test and histopathology-IHC correlation is considered a good quality indicator to assess diagnostic accuracy of histopathology laboratory.
Aims: The goal of this study was to find diagnostic discrepancy between histopathology and IHC in an effort to improve the performance of the laboratory.
Methods and material: A retrospective analysis was done in Histopathology section of Central Diagnostic Laboratory of Shree Krishna Hospital, Karamsad. In this study, during the study period of three years (from 2013 to 2015 till October) cases for which IHC was requested were included. Total number of concordances and discordances are assessed to improve histopathological diagnostic accuracy. For each discordant case root cause analysis was done to identify areas of weakness.
Statistical analysis used: none
Results: During the study period total 145 cases were sent for IHC. Out of which 124 (85.51%) samples had concordance and 21 (14.48%) had discordance. During the year 2013, 2014 and 2015(till October), number of discordances in histopathology and IHC were 29.41%, 11.11% and 12.87% respectively.
Conclusions: This comparison of histopathology-IHC diagnosis over the last three years has helped us significantly to improve our laboratory services in terms of performance evaluation, patient care and overall quality of laboratory practices.

Introduction:-

The histological diagnosis of cancer and the categorization of the proper tumour type are essential for the adequate treatment of malignant tumours. The distinction between histologically similar tumours is often critical as therapeutic options often differ.[1] Immunohistochemistry has emerged as the most valuable adjunct to Hematoxylin and Eosin (H&E) staining in diagnostic histopathology.[2] This technique has equipped the histopathologist with the tools needed to tackle the most common diagnostic problems in tumour pathology especially the characterization of the undifferentiated or poorly differentiated malignant tumours, whether primary or metastatic.[3,4]
Important elements of quality in surgical pathology include report accuracy, timeliness and report completeness. Monitoring of histopathology-IHC can be used as quality indicator of analytical phase, to assess diagnostic accuracy of the surgical pathology laboratory. IHC is mainly indicated for following three purposes: 1) Conformation of diagnosis, 2) Determination of site of origin of metastatic tumours and 3) Detection of molecules that have prognostic or therapeutic significance.

Objective: -

The goal of this study is to determine the role and significance of IHC in the adequate and accurate characterization of malignant tumours. The objectives are as follow:

- To find diagnostic discrepancy between histopathology and IHC in an effort to improve the performance of the laboratory.
- To identify and access areas of weakness during root-cause analysis of discordant cases.

Methodology:-

A retrospective analysis was done in Histopathology section of Central Diagnostic Laboratory of Shree Krishna Hospital, Karamsad, during the study period of three years (from 2013 to 2015). In this study, cases for which IHC was requested by clinician or advised by pathology consultants were included.

- Inclusion criteria
  - Histopathology cases for which IHC is requested for diagnostic confirmation were included.
- Exclusion criteria
  - Cases for which IHC is requested for prognostic and therapeutic markers were excluded.

Total number of concordances and discordances are assessed to improve histopathological diagnostic accuracy. For each discordant case root cause analysis was done to identify areas of weakness.

Results:-

During the study period, a total of 8200 biopsies were reported in surgical pathology section of Shree Krishna Hospital, Karamsad. Out of which IHC for diagnostic confirmation or sub-typing were requested for only 142 biopsies (1.73%).

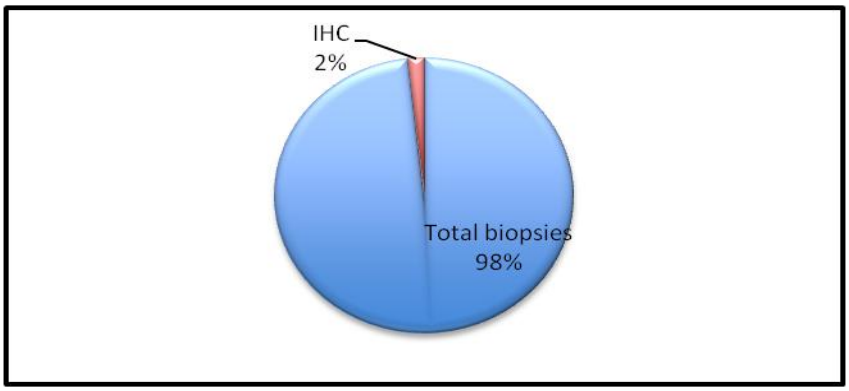

Figure 1 Percentage of IHC performed

Out of which, in 115 (80.98%) cases histopathology diagnosis was in concordance with IHC diagnosis. While in 22 (15.49%) cases histopathology diagnosis was discordant with IHC diagnosis. For 5 (3.52%) cases conclusive diagnosis could not be derived.

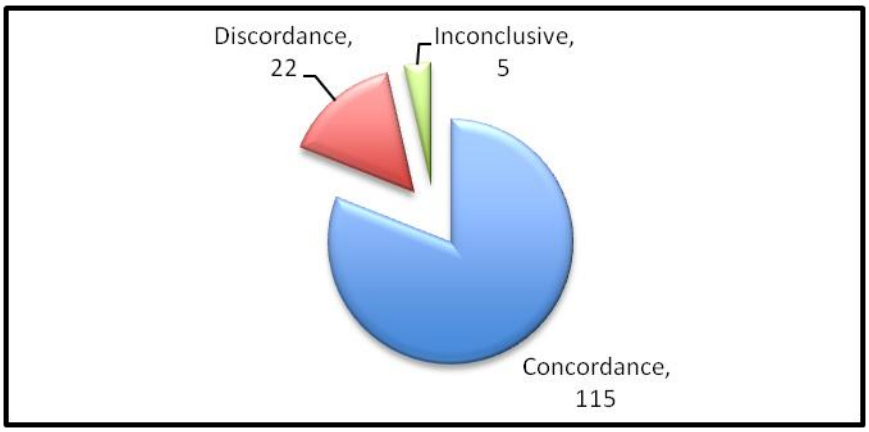

Figure 2 Histopathology-IHC correlations

Year wise performance of histopathology correlations are tabulated and depicted in chart as follow.

Table 1 Year wise performance of histopathology-IHC correlation

Year	**2013**	**2014**	**2015**
Concordance	78.12% (25)	87.5% (21)	80.23% (69)
Discordance	18.75% (6)	12.50% (3)	15.11% (13)
Inconclusive	3.12% (1)	0	4.65% (4)
Total	32	24	86

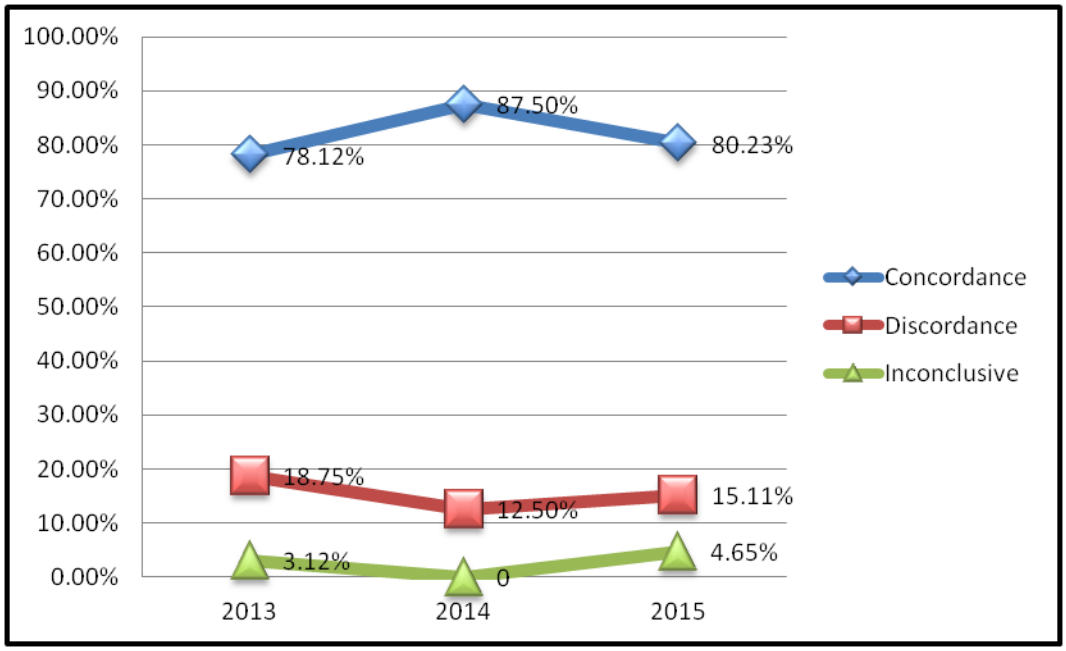

Figure 3 Year wise performance of histopathology-IHC correlation

The cases for which IHC were requested were broadly catalogued as soft tissue tumours, lymphomas, bone tumours, brain tumours etc. The findings are tabulated as follow.

Table 2 System/Diagnosis wise concordance and discordance

Category	Total biopsies requested	IHC done	Concordance	Discordance
Lymphoma	91	45	38	7
Soft tissue	63	18	16	2
Undifferentiated tumours	17	15	12	3
Brain	21	9	7	2
Small round cell tumour	10	9	7	2
Bone marrow	186	5	3	2
Genito-urinary tract	3088	4	2	2
Liver	112	3	2	1
Miscellaneous	4612	29	28	1
Total	8200	137	115	22

(Biopsies from head & neck with squamous cell carcinoma and skin biopsies are not included in the table.)

Root cause analysis was done for all discordant cases. Maximum discordant cases were noted with diagnosis of lymphoma due to inadvertent attempt at typing of the lymphoma on histopathology examination. Other discordant cases were noted with soft tissue tumours, undifferentiated carcinomas and brain biopsies. Among miscellaneous lesions a case of thymic carcinoma was discordant. The discordant cases were reviewed by senior consultants and interpretational error in histopathology reporting was concluded as the reason for discordance with IHC.
Corrective actions were taken for these cases with intimation of the IHC report and possible change in final diagnosis to the treating clinician. The slides were reviewed by the consultants who had done the original diagnosis, so that the difference in opinion could be understood. For prevention of further similar discordance preventive actions were contemplated with training, awareness and sensitization of the authorized signatories and the clinicians towards the interpretational (analytical) skills.
For inconclusive cases repeat biopsy and IHC were advised. However, due to high cost of IHC and patients refusal to undergo repeat biopsy procedure were major hurdles in proceedings for deriving conclusive diagnosis.

Discussion:-

In present study, it was observed that IHC for diagnostic conformation and sub-typing was done for only a small fraction of biopsies reported in the histopathology section.

However, for the cases of lymphoma, soft tissue tumours, undifferentiated tumours and round cell tumours for which IHC is of utmost importance for confirmation and sub-typing; IHC was done for considerable number of cases. In cases with histopathology diagnosis of round cell tumours, undifferentiated tumours, lymphoma and soft tissue tumours IHC were performed in 90.00%, 88.23%, 49.45% and 28.57% cases.

It was noted in the present study that majority of the biopsies were comprised by those from head and neck region for squamous cell carcinoma, various benign conditions of genitor-urinary system especially female reproductive system and skin biopsies for benign conditions. Such cases rarely require IHC confirmation for diagnosis. This fact was responsible for overall low proportion of IHC performed for diagnostic confirmation and sub-typing.
For breast lesions, IHC for diagnostic conformation was done for only 0.70%. As majority of the IHC done for breast malignancies were for receptor study. Similarly for biopsies from gastrointestinal tract only 0.61% IHC was done for diagnostic confirmation, as for these lesions IHC is mostly requested for proliferation markers.

Conclusions:-

This comparison of histopathology-IHC diagnosis over the last three years has helped us significantly to improve our laboratory services in terms of performance evaluation, patient care and overall quality of laboratory practices.

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