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Original Article

Audit of Gastric Cancer Histopathology Reports – A Systematic Step Forward

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ABSTRACT

Background: Gastric cancer is the second most common cause of cancer-related mortality worldwide. Surgical resection remains the mainstay for treatment. Histopathology reports of these surgically resected specimens play an important part in deciding prognosis as well as future treatment options.

Objective: This audit was carried out principally to assess adherence of histopathology reporting of gastric cancer cases in our hospital to minimum datasets by Royal College of Pathologists. The essential aim was to promote this practice and improve the standard of reporting in our country as well as health centers across the region.

Methods: This study was carried out from 1st January 2008 to 30th January 2016. Data for audit was collected from computer records using Oracle software. Only gastric epithelial malignancies were included. Criteria from the core and noncore dataset items were marked as either present or not present. After the presentation of the initial audit, deficiencies in reporting were highlighted and a re-audit was carried out.

Results: The mean percentage of completion of reports was 86.47 ±8.267.Tumor size, histological differentiation, lymph node status, proximal and distal resection margins were mentioned in all (100%) cases. Reporting of circumferential resection margin was most inconsistent and there were 32 (37.6%) cases in which pathologists failed to mention this core data item. Noncore data items were poorly represented. Re-audit showed marked improvement in reporting standards with circumferential and lymphovascular invasion missing in only 01 (5.6%) case.

Conclusion: In our opinion, standard typed performas are necessary for improving pathological reporting. Moreover, audits should be a regular part of histopathological reporting in our part of the world similar to that seen in West as this is the only way to evaluate ourselves and allows continuous improvement.

Key words: Audit, Gastric carcinoma, Histopathology reports, Surgical pathology reports

Introduction

Currently, gastric cancer is the fourth most common malignancy and second most common cause of cancer-related mortalityfor both genders across the world.[1]Worldwide, there is marked variation in the prevalence of gastric cancer in different regions. The highest prevalence is seen in East Asia, Latin America and Eastern Europe.[2]South and central Asia are identified as low to moderate risk regions.[3]In Pakistan, a study conducted in Karachi showed that the Age-standardized incidence rate (ASR) of gastric cancer in Karachi was 6 per 100,000 in males and 3.6 per 100,000 in female respectively.[4]

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It is hinted that mortality rate among gastric cancer patients in Pakistan is increasing due to advanced stage at presentation and increased number of positive lymph nodes.[5]

Surgical resection remains the mainstay of treatment in patients with gastric carcinoma. Histopathology reports of these surgical specimens are essential so as to provide information with regards to completion of resection along with further management and prognosis of the patient. Adequate surgical resection requires both negative surgical margins as well as removal of an optimal number of lymph nodes which is atleast 15 in case of gastric cancer.[6]Evidence for both of these features can be given only by means of the pathology report. In addition, these reports provide useful information that contributes towards accurate staging and grading of gastric cancers. The prognosis remains dismal for these cancers and a complete

histopathology report is crucial in facilitating the clinicians regarding possible further treatment and prognosis of the patient. Moreover, these reports can be used as a research tool to assess the accuracy of preoperative staging techniques such as CT scan.

Clinical audit is defined by National Institute for Clinical Excellence (NICE) as "a quality improvement cycle that involves measuring effectiveness of healthcare against agreed and proven standards for better quality, and taking necessary action to bring practice in line with these set standards so as to uplift the quality of patient care and health outcomes".[7]Although clinical audits are regularly carried out and form a part of a continuous quality improvement program in the west, this practice is not well recognized in our country.

This audit was carried out principally to assess adherence of histopathology reporting of gastric cancer cases in our hospital to minimum datasets by Royal College of Pathologists and to evaluate our department's standard with reference to international practice. The essential aim was to promote this practice in laboratories and hospitals across the region so that deficiencies could be highlighted and sequential steps may be taken to improve reporting practices which would ultimately benefit in patient management as well as prognosis.

Methodology

This study was carried out from 1st January 2008 to 30th January 2016. Data for audit was collected retrospectively over a period of 06 years from 1st January 2008 to 30th December 2014 from computer records using Oracle software. All gastrectomy reports were retrieved from computer data by utilizing non-probability, consecutive sampling technique. Out of a total of 262 gastrectomy specimens reports retrieved during this period only gastric epithelial malignancies were included. All gastroesophageal junction tumors with greater than 50% overlap of the esophagus, carcinoid tumors, and nonepithelial malignant gastric tumors were excluded. Also not included were sleeve gastrectomies.

Records were analyzed retrospectively and validated jointly by the observer and resident histopathology. To ensure the accuracy of data collection, 15 reports were selected at random and analyzed, in the same way by a consultant histopathologist who was also the team lead.

Criteria from the core and noncore dataset items (**Table 1 and Table 2**) were marked as either present or not present.

Table 1. Core data items of minimum requirement for appropriate patient management

Macroscopic Features
• Tumour site • Tumour size (maximum diameter) • Tumour morphology (polypoid, ulcerative, fungating, diffusely infiltrative).
Microscopic Features
• Maximum extent of invasion through wall (pT staging) • Histological type • Histological differentiation (worst) • Resection margins (proximal, distal and circumferential) • Lymph node status • Presence of lymphatic or vascular invasion

Table 2. Non-core data items; optional for reporting

Macroscopic Features
• Specimen dimensions: The overall dimensions of the specimen and the lengths of stomach (greater and lesser curve) and oesophagus/duodenum should be recorded in millimeters.
Microscopic Features
• Presence of glandular atrophy • Presence of intestinal metaplasia • Presence of dysplasia • Presence of Helicobacter Pylori

Those items were marked as a present which completely filled the criteria as outlined in the dataset, for example, specimen type had to show the type of gastrectomy (total, subtotal, partial distal, partial proximal, radical). Core data items are the minimum requirements which are deemed necessary in a histopathology report. Such data has been shown to be of proven prognostic value and affects patient management. Noncore data items are additional data items that have no established prognostic significance, however, they might be of interest to the clinician and used in patient management.[8]

This audit was presented in an intradepartmental meeting on 1st January 2015. In the same meeting, all the shortcomings of our current reporting along with areas for potential improvement were discussed. Recommendations were made in order to improve the

level of reporting in future. It was decided in the meeting that a time frame of 30 days, will be given during which the changes decided upon will be implemented and after a period of one year a re-audit will be conducted. In the re-audit, all gastrectomy specimen reports from 1st February 2015 to 30thJanuary 2016 were retrieved. The same methodology which was outlined for the audit was followed for re-audit.

Statistical analysis was performed using SPSS 21. Frequency and percentages were calculated for categorical variables, mean and standard deviation were calculated for quantitative variables. Core data items in Audit and Re-audit were compared using Chi-square/Fisher's exact test for qualitative variables and independent sample-t-test for quantitative variables. A p-value of <0.05 was considered significant.

Results

Out of a total sample size of 85 cases, as for core data items 12 (14.1%) reports were 100% complete, most reports that is 38 (44.7%) were 90% complete and none of the reports was less than 70% complete, which means there was no report which mentioned less than 7 out of 10 core data items. The mean percentage of completion of reports was 86.47% with a standard deviation (STD) of ±8.267.

Tumor size, histological differentiation, lymph node status, proximal and distal resection margins were mentioned in all (100%) cases. Reporting of circumferential resection margin was most inconsistent and there were 32 (37.6%) cases in which pathologists failed to mention this core data item. Next in line were tumor morphology and histological type which were not documented in 28 (32.9%) and 20 (23.5%) reports. Pathological (pT) stage was well represented and was only found to be missing in 02 (2.4%) reports (**Table 3).**

Non- core data items were poorly represented. Specimen dimension was the only parameter which was mentioned in all (100%) reports. Glandular atrophy was not mentioned (0%) in any report. Intestinal metaplasia was reported in 15 (17.6%) cases **(Table 4).**

Table 3. Frequency and percentage of audit reports for core data items

Core Data Items		Completed		Not completed	
		Frequency (n)	Percentage	Frequency (n)	Percentage
Specimen Type		79	92.9%	6	7.1%
Tumor site		81	95.3%	4	4.7%
Tumor size		85	100%	0	0%
Tumor morphology		57	67.1%	28	32.9%
pT Stage		83	97.6%	2	2.4%
Histological type		65	76.5%	20	23.5%
Histological differentiation		85	100%	0	0%
Resection Margins	**Proximal**	85	100%	0	0%
	Distal	85	100%	0	0%
	Circumferential	53	62.4%	32	37.6%
Lymph node status		85	100%	0	0%
Lymphovascular invasion		83	97.6%	2	2.4%

n, number of patients

Table 4: Frequency and percentage of audit reports for non-core data items

Non-core Data Item	Completed		Not completed	
	Frequency (n)	%age	Frequency (n)	%age
Specimen dimension	85	100%	0	0%
Glandular atrophy	0	0%	85	100%
Intestinal metaplasia	15	17.6%	70	82.4%
Dysplasia	4	4.7%	81	95.3%
Presence of H. pylori	7	8.2%	78	91.8%

n, number of patients

In the re-audit, we received a total of95gastrectomy specimens, of which 18 were identified as having adenocarcinoma and were included in the study. A noticeable improvement in the reporting of core data parameters was seen. Specimen type, tumor site, tumor size, pT stage, histological differentiation, lymph node status, proximal and distal resection margins were mentioned in all (100%) cases. Lymphovascular invasion and circumferential margin were missing in only 01 (5.6%) case. Reporting of tumor morphology and histological type did not differ significantly from the initial audit and these

parameters were missing in 05(27.8%) and 04 (22.2%) cases respectively. A comparative analysis of core data items in audit and re-audit showed significant positive representation of circumferential resection margin in Re-audit. In addition mean percentage of completion of reports also showed significant improvement from 84.67 in audit to 93.89 in re-audit. (p-value < 0.005)

As for non-core data items in re-audit, there was not much variation from the main audit. Specimen type was mentioned in 100% of the cases, glandular atrophy was not mentioned in any case. Intestinal metaplasia was mentioned in 06(33.3%) reports. Rest of the data items were present in < 20% of the reports

Table 5. Table showing a comparative analysis of core data items in Audit and Re-audit

Variables		Audit		Re-audit		p-value
		Completed	Not Completed	Completed	Not Completed	
Specimen Type		79 (92.9%)	6 (7.1%)	18(100%)	0 (0%)	0.245
Tumor site		81 (95.3%)	4 (4.7%)	18(100%)	0 (0%)	1.000
Tumor size		85 (100%)	0 (0%)	18(100%)	0 (0%)	*
Tumor morphology		57 (67.1%)	28(32.9%)	13(72.2%)	5(27.8%)	0.785
pT Stage		83 (97.6%)	2 (2.4%)	18(100%)	0 (0%)	1.000
Histological type		65 (76.5%)	20(23.5%)	14(77.8%)	4(22.2%)	1.000
Histological Differentiation		85 (100%)	0 (0%)	18(100%)	0 (0%)	*
Resection Margins	**Proximal**	85 (100%)	0 (0%)	18(100%)	0 (0%)	*
	Distal	85 (100%)	0 (0%)	18(100%)	0 (0%)	*
	Circumferential	53 (62.4%)	32(37.6%)	17(94.4%)	1(5.6%)	0.000
Lymph node status		85 (100%)	0 (0%)	18(100%)	0 (0%)	*
Lymphovascular invasion		83 (97.6%)	2 (2.4%)	17(94.4%)	1(5.6%)	0.442
Mean% completion of reports		86.47± 8.267		93.89± 6.97		0.001

* Statistical analysis could not be performed as the variables of interest showed 100% completion in both groups.

Discussion

The histopathology report provides essential information to the clinician. It remains the mainstay as a determinant of disease stage and prognosis after surgery. High-level reporting is crucial so as to decide further treatment and management for the patient and hence improve net health outcome. [9]It is therefore of utmost importance that histopathology reports should meet the minimum standards (reporting of core data items) set by RCPath.[8]

Although the standard of reporting being done at our institute was almost satisfactory, however, there were only 12(14.1%) reports which met the minimum standard criteria. If we compare this with other studies done worldwide, an audit carried out by King of five hospitals in the UK,showed that none of the reports met the minimum standards set by RCPATH.[10]Similarly, an audit by Akhavan[6]documented that none of the reports in his center were able to meet the minimum standard criteria .Burroughs in 1999 carried an audit of upper gastrointestinal cancers which revealed that 77% of gastric cancer pathology reports met the minimum standards but one thing that must be taken into account is that the standards in his study were not that of RCPath rather they were decided by the audit team and included only 04 criteria which were tumour type, local excision, depth of invasion and involvement of lymph nodes.[11] One of the positive things about our reporting was that on an average our reports were 86.47% complete and at a minimum were at least 70% complete, in contrast, a similar type of study done by King[10] in UK showed that atleast 04 out of 56 of the reports at his center were <50% complete.

Some of the items included in the minimum datasets such as primary tumor stage, lymph node status, margins, and histological differentiation are the most important determinants of postoperative chemotherapy.[12]Among these, histological differentiation, proximal along with distal resection margins and lymph node status were mentioned in all our reports whereas tumor stage was missing in only 02 reports. Although, we could not retrieve any local, published gastric cancer reporting audit from our part of the world for comparison, however, studies done in other parts of the world show that these items are generally well represented.[6,10] A point of serious concern that was noted in our reports was that circumferential resection margin was under-reported. This could have been due to a number of reasons. For one, failure of identification by resident pathologists of

this margin, for another use of inappropriate terms such as serosal etc for this type of margin. These terms are not only irrelevant but also confusing both for fellow pathologists as well as concerned clinicians. Therefore for this purpose, such terms wherever used during reporting were counted as being not mentioned.

Another flaw which was noted in our reporting was that inconsistent terms were being used to describe macroscopic tumor morphology. RCPath datasets encourage the use of Borrman classification for describing tumor morphology as these sub-types bear an impact on overall survival.[13]However, our study showed that multiple self-explicit terms by the pathologists such as protruded, flattening and so on were being used. Similarly, the histological type was clearly mentioned in only 76.5% of our reports. Again, this deficiency was due to non-usage of Lauren Classification as given in the dataset and instead following a free – text reporting style for histological typing. Lauren Classification subdivides gastric adenocarcinoma into intestinal vs diffuse subtypes, which not only signifies two separate entities with different histogenesis and molecular characteristics but also emphasizes their distinct biological behavior and varied sensitivity to chemotherapy regimes.[14,15] Therefore, reports mentioning only adenocarcinoma as histological type were considered to be insufficient in reporting this particular parameter. The audit done by Akhavan[6] showed that 80.4% of the reports failed to follow this classification.[6] Except for specimen dimensions, all other parameters in noncore data items were poorly represented in our study. A study by King[10]showed that these background abnormalities, on the whole, were mentioned in 48% of his reports which is better as compared to our reports.

To recapitulate, the main reasons for inconsistency in our reporting were due to the usage of different types of formats, free –text reporting and usage of unstandardized terms. It was thus decided at the time of presentation of an audit that in future standard already typed datasets by RCPath will be used in which the pathologist simply had to tick the appropriate category. This will not only be time-saving but also help in uniform reporting as free text reporting along with summarized style reporting encourages the use of dubious terminologies and also important pointers are left out. Emphasis was made on learning the correct grossing techniques and the importance of core data items in patient management and survival.

On re-audit, an improvement was seen in reporting of all core parameters. The reporting of the histological type was however improved marginally. For noncore data items except for intestinal metaplasia which was more frequently mentioned on re-audit, no other significant change was seen.

Conclusion

In our opinion, standard typed performas are necessary for improving pathological reporting. This allows the pathology report to be comprehensive and understandable both for the clinician and other pathologists. Moreover, audits should be a regular part of histopathological reporting in our part of the world similar to that seen in West as this is the only way to evaluate ourselves and allows continuous improvement.

Conflict of Interest: Authors declare no conflict of interest.

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Authors' Contribution

HN & NT: Study conception, study conduction, data analysis and manuscript writing

UL: Study conception, study conduction and data analysis