Practical Neuropathology Synoptic Reporting for Central Nervous System Tumors

Mark W. Becher, MD

- **Context.**—Synoptic reporting for central nervous system (CNS) tumors has never been formally addressed, and neuropathologists lack practical templates that they can adapt to their laboratory information system to be compliant with College of American Pathologists (CAP) standards.

- **Objectives.**—To provide practical synoptic report templates designed for CNS tumors that allow for easy data extraction and CAP compliance and improve the reporting of CNS tumors.

- **Data Sources.**—Review of literature and synoptic report format experience in our practice.

- **Conclusions.**—Synoptic reporting of required elements is a recently introduced standard for CNS tumors. It is difficult to use a universal non-CNS tumor synoptic report template for CNS tumors because they are heavily weighted to include items not important or required for CNS tumors, such as margins and the TNM classification system. In addition, the CAP CNS protocol, published in 2008, is an immense comprehensive document that is not conduclive to simple inclusion in a narrative report. We describe our experience using a synoptic template for CNS tumors that includes all required elements, is tailored to the practice of neuropathology, and can easily be adapted to other laboratory information systems. Because of the multidisciplinary nature of CNS tumor diagnoses, neuropathologists typically collect clinical, demographic, and imaging data on all CNS tumor cases. These data can readily be entered into a primary synoptic report that could replace our standard narrative report. (Arch Pathol Lab Med. 2011;135:789–792)

Synoptic reporting has largely not yet extended to the reporting of tumors of the brain and spinal cord. In large part, this is most likely because central nervous system (CNS) neoplasms are not included in the American Joint Committee on Cancer/International Union Against Cancer TNM classification system. Central nervous system tumors were not included in the initial efforts to modify pathology reports, for the top 5 cancer sites in each institution, to include synoptic tumor text (published in 2004 and revised in 2009) that has evolved into the substrate for synoptic protocols for pathology reports mandated by the Commission on Cancer of the American College of Surgeons. Required elements for CNS tumors have been recently provided in a College of American Pathologists (CAP) protocol published by a neuropathology task force for the CAP Cancer Committee. The CAP Neuropathology Checklist, which is used for CAP site visit accreditation purposes, includes synoptic reporting and required elements for neuropathology tumor reports at the phase 0 level for the first time in the June 2009 revision. In practical terms, it is difficult to simply use a synoptic report designed for a different organ system, such as colorectal tumors for CNS tumors, and it is quite likely that very few neuropathologists have adopted synoptic reporting. We have been experimenting with CNS tumor synoptic reporting for the past 13 months. The goal of this article is to provide practical examples of CNS tumor synoptic reporting templates that are compliant with the CAP guidelines and Commission on Cancer requirements, yet are tailored to the practice of neuropathology.

**OVERVIEW OF SYNOPTIC REPORTING**

The analysis of how surgical pathology reports are constructed and what they should contain are the basis of much attention at the present time. It is generally accepted that providing a narrative report for cancer cases, which is difficult to read or use and from which data elements for coding purposes are impossible to extricate, is fraught with many problems and is not acceptable in modern surgical pathology. At the other end of the spectrum are very sophisticated synoptic reports generated by high-level information systems that include all mandatory data elements. Synoptic reports are defined as reports that present data in an outline, list, or table format with clearly identified headers and responses. Most reports, at present, probably fall somewhere in between these 2 extremes.

For editorial comment, see p 691.

For most of us, narrative reports are the foundation of our training in anatomic pathology and its subspecialties. Yet, anyone who reviews consultation material from many institutions knows that the presentation and order of many narrative format reports are often very difficult to
This checklist is accepted as adapted from Parisi et al. Synoptic reporting of central nervous system tumors as with permission from Synoptic Neuropathology Reporting—Arch Pathol Lab Med—Vol 135, June 2011.

Abbreviations: EM, electron microscopy; WHO, World Health Organization.

MPNST, malignant peripheral nerve sheath tumor; WHO, World Health Organization.

In a word-processing application, abbreviations: bx, biopsy; can be listed in an addendum. Some reports lead off with the intraoperative diagnoses and one has to search for final diagnoses. Synoptic reports, on the other hand, are by definition very succinct and many consider them also more intuitive. To arrive at a diagnostic conclusion, we work through a series of decisions and each of these data points are conducive to synoptic reporting. In fact, many of us use or have generated data collection forms for translational research projects in this format, but yet continue to use narrative reporting for the very cases from which we extract data for research purposes. The challenge for surgical pathologists is to devise pathology reports that satisfy the necessary requirements of timeliness, ease of use and readability, accuracy in reporting the pathologic findings to clinicians, and completeness for billing and quality management purposes, while also producing a product that includes the mandatory elements and is useful to a whole variety of other users, such as data coders, tumor registrars, and epidemiologists. One can envision that reports could become massive checklists in which every subtle cellular and architectural detail is envisioned that reports could become massive checklists in which every subtle cellular and architectural detail is.

CAP PROTOCOL FOR BRAIN AND SPINAL CORD TUMORS

Central nervous system tumors are difficult to report with a universal synoptic report designed for another organ system for which the TNM classification system is used. In practice, neuropathologists would probably leave nearly all fields blank or circle the “not applicable” option, yet be left with a report that excludes criteria used to establish specific diagnoses and grades. The Neuropathology Task Force for the CAP Cancer Committee devised a very comprehensive checklist-format protocol for tumors of the brain and spinal cord. This checklist is accepted as providing the required elements for neuropathology reports and is regarded as the CAP standard for accreditation purposes (Table). The format of this checklist, as presented, is immense and includes all possible tumors—as listed in the 4th edition of the World Health Organization (WHO) classification—on individual lines, which may be checked off as a single diagnostic conclusion. Adding this information, as published, would necessitate adding up to 20 extra pages to a standard narrative report. Obviously, that is not the intention of this checklist; rather, it is to provide all the possible individual fields and WHO diagnoses in a checklist. Ideally, one could engineer this multipage document into drop-down menus or single-answer fields in pathology information systems. But for those of us who are not information technology experts or who have inflexible pathology systems, this is a formidable task. Despite having this CAP protocol available, not many neuropathologists have applied this protocol in their practice on a daily basis.

SURGICAL NEUROPATHOLOGY PERSPECTIVE

Neuropathology by its very nature is interdisciplinary. To arrive at a specific diagnosis, we often need to include...
clinical, demographic, radiologic, and other data points that are not always necessary in the practice of many other aspects of surgical pathology. Many of these items would also not appear in a standard, TNM-type synoptic checklist. The CAP standard protocol for CNS tumors includes these elements, such as a long history of seizures or extent of enhancement on imaging studies, as nonmandatory. In reality, including many of these data points in a neuropathology synoptic report would not be as onerous a task for neuropathologists as it might be for surgical pathologists—if required to record the presenting symptoms for every patient with a cholecystectomy specimen—because neuropathologists would have already collected this information. Therefore, even if the submitting requisition simply states “brain tumor,” many additional data points would have been amassed before arriving at the final diagnostic decision. Thus, neuropathology reports are very conducive to synoptic reporting.

Figure 2. Primary synoptic report for central nervous system neoplasms. Extrapolating from the synoptic central nervous system (CNS) tumor template used in addition to a narrative report, this synoptic template could replace the entire classic narrative CNS tumor report in synoptic format. This format differs from a data collection sheet in that free text is added in each answer or comment field rather than an integer defined in a key. The answer fields could be numbered for ease of dictation to a transcriptionist. Mandatory fields could also be identified in bold or italics. Abbreviations: Adeq, adequate; bx, biopsy; Ctl, control; MPNST, malignant peripheral nerve sheath tumor; Neg, negative; perivasc inflam, perivascular inflammation; Pos, positive; Rosenth, Rosenthal fibers; smear/touch prep, smear or touch preparation; vasc prolif, vascular proliferation; WHO, World Health Organization.
in which this contributory but nonmandatory information can be summarized and reported in a separate section. In settings with future participation of multidisciplinary tumor boards, it would also be helpful if all this contributory information were accurately reported in one place, together with the pathologic diagnosis.

It is difficult to formulate a generalization on how we use specific cellular or architectural variables in neuropathology. This presents added challenges in creating a synoptic report. For example, for one phenotype of tumors, just the presence of mitotic figures might be important, whereas for another, a more standard, surgical pathology-type analysis indicating x mitoses per y high-power fields might be required. Thus, the report needs to accommodate both a yes/no answer option for mitoses as well as a quantification option to use when appropriate. Margins are a major component of non-CNS TNM-type surgical pathology reports but are almost never a factor in brain or spinal cord tumors. The reason is primarily because neurosurgeons base their decisions for resection on factors other than whether tumor is present at a margin, such as the eloquence of the structure, vascularity, and the predicted impact of resection on the natural course of disease. The CAP protocol for CNS tumors states that margins are required only for malignant peripheral nerve sheath tumors.2

SYNOPTIC REPORTING OF CNS TUMORS AS SUPPLEMENT TO NARRATIVE REPORT

We have been using a synoptic report format in combination with our standard narrative surgical neuropathology reports for 13 months (Figure 1). We have found that this format, although redundant with the immediately preceding narrative diagnosis and comment, allows us to synoptically record in 1 place the same information that is found in several different areas of the narrative report, is readable, becomes easier to fill out with practice, and allows us to reconsider each of the diagnostic variables. In contrast to the exhaustive list of all possible diagnoses provided in the CAP protocol,2 which is organized with phenotypic heading followed by individual entities that are preceded by a line to be checked, we selected the reverse approach in alignment with that of the TNM system, whereby there is a variable name or header followed by the response (Figure 1). Rather than sophisticated drop-down menus, we use answer fields that follow the headers and have filled the answer fields with prompts that are overwritten with the entry of choice. This clarifies the inherent ambiguity of some of the mandatory terms so that the correct items are placed in the correct place. For example, the term histologic type is used in the CAP protocol for “diagnosis,” and “tumor site” does not include laterality which is recorded on a separate line. Different font sizes or bold characters could be used to emphasize the diagnosis line or other items that individual practitioners wish to stress. Margins, although not useful to CNS tumors, are included to state that they are not available, which is useful information for data collectors; they also complete the neuropathology synoptic report, as per the proposed standards, and allow the report to follow a modified standard surgical pathology format.

SYNOPTIC REPORTING OF CNS TUMORS AS THE PRIMARY REPORT

For the sake of completeness, it is of interest to take the synoptic supplemental report that we have already started to use and attempt to transform a complete neuropathology report into a synoptic report (Figure 2). While at first seemingly unwieldy, like many translational research data collection slide review forms, this report template simply presents the same information that we typically include in our narrative prose and replaces the standard sections of diagnosis, comment, gross examination, etc, that each of us now use. As opposed to a research data collection sheet, which has many fields for entering an integer from a given key to indicate “mild/moderate/marked,” this is not a primary coding sheet but rather free text entered after each header. For example, the heading “Other cellular forms” might include “Rosenthal fibers, eosinophilic granular bodies, and multinucleated giant cells,” simply inserted as a list separated by commas in the answer field. Each answer field could have a number or other designation to allow for efficient dictation and transcription. The mandatory data element fields could be identified in the report format to encourage compliance, and individual styles can be applied that would change the order of information or highlight specific items in several different ways. It remains our task to ensure that such a report will still maintain the high standards that we currently apply to narrative-based reports for accuracy, timeliness, and completeness. Perhaps these templates might be the foundation for an effort to include synoptic reporting in neuropathology reports and for the development of future synoptic report projects for CNS and even non-CNS tumors.

References


