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STAGING

OF

MUSCULOSKELETAL TUMORŞ



ESSAY

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CONTENTS..

*	DEVELOPMENTAL TUMORS AND TUMOR-LIKE CONDITIONS.84-85
*	SUMMARY86 - 90
*	REFERENCES91 - 9
*	Arabîc summary .

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*INTRODUCTION.

INTRODUCTION



The concept of staging musculoskeletal neoplasm arose in response to the need for meaningfull assessment of various methods of treatment in end result studies. Its purpose was to ensure that lesions of comparable prognostic important were used to evaluate methods of management. So that one form of treatment was not inadvertently based by inclusion of preponderance of favorable lesions while another method was adversely weighted on the bases of lesions with unfavourable predictors [Enneking et al.,1980].

Staging system based on; the natural history of the tumor has been developed for almost all histogenic type of various malignant neoplasm. Conspicuous by its abscence has been a staging system for sarcomas of connective tissues derivation.

The purposes of a staging system for musculo-skeletal neoplasms are to: (1) Incorporate the significant prognostic factors into a system which describes progressive degrees of risk of local recurrence and distant metastases to which a patient is subject. (2) Stratify the stages so they have specific implications for surgical management, and (3) Provide guidelines for adjunctive therapies [Enneking et al., 1980].

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REVIEW OF LITERATURE

OF THE STAGING SYSTEM.

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REVIEW OF LITERATURE OF THE STAGING SYSTEM

The first staging system was developed for carcinoma of the cervix. The predictors were local invasion, regional metastasis to lymph nodes and distant metastasis to other organs.

In the ensuring years the importance of the concept of staging has been widely recognized and adopted internationally.

Staging system based on: The natural history of the tumor has been developed for almost all histogenic types of various malignant neoplasm conspicuous by its abscence has been a staging system for sarcomas of connective tissues derivation.[Gottliob, J.A.: Baker, L.H., 1975].

Since its organization in 1959 the American Joint Committee for Cancer staging and end Results Reporting (AJC) has undertaken responsibility for developing clinically useful staging system for many kinds of cancer. [American Joint Committee For Cancer Staging, 1977].

The intent of staging is to designate "The state of a cancer at various points in time and is related to the natural course of this particular type of cancer."

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The purpose is to "provide a way by which this information can be readialy communicated to others, to assist in decisions regarding treatment, and to be a factor in judgement as to prognosis."

Ultimately, it provides a mechanism for comparing like or unlike groups of cases, particularly in regard to the results of different therapeutic procedures. [American Joint Committee for Cancer Staging, 1977].

The (AJC) systems have been used extensively in staging of carcinomas, and have proven useful both prognostically and therapeutically.

The (AJC) system is based on T,N and M. It is a histopathologic grades. [Russell, W.O., et al., 1977]. Where

(T) designates the local extent of the primary tumor (often translated into size) where:

It indicates that lesion is less than 5 cm.

T2 indicates that the lesion is 5 cm or greater.

- and T3 indicates that the tumor that grossly invade bone, major vessel or major nerve.
- (N) designates regional lymph nodes extent where:
 - No indicates that there are no histologically verified metastases to regional lymph nodes.
 - N1 indicates that histologically verified regional lymph node metastasis.
- (M) designates the distant metastasis where:

Mo means no distant metastasis.

Mi means distant metastasis.

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paramount importance of the malignancy grade in determining stage and prognosis for soft tissue sarcomas it necessary to add grade (G) to TNM designation rather than representing grade in the assessment of T (Tumor). [Broders, A.C., et al., 1939; Enneking, W.F., al.. in press; Evans, H.L., et al., 1977; Hajdu S.I., 1979; Lieberman. Z., and Ackerman, L.V., 1954: Manual for Staging of Cancer, 1977; Pack, G.T., and Ariel, I.M., 1952; Pritchard, D.J., et al., 1980; Quick, D.C., and Cutler, M., 1927; Shiu, M.H., et al., 1975].

So in 1975 the (AJC) proposed a clinical and pathological staging system for musculoskeletal sarcomas. The system is a modification of the TNM classification where the surgical grade (G) was added where (Go) Benign (G1) low grade malignant, and (G2) high grade malignant [Romsdahl, M.M., and Ayala, A.G., 1977]

The system was TNMG where (T) local extent, the presence or abscence of regional metastases (N) and the presence or abscence of distal metastases (M).

The for which this system was designated are sarcomas those arising from the mesenchymal connective tissue of musculoskeletal system. the Lesions derived from the marrow, reticulo-endothelial tissue housed within bone mesenchymal soft tissue and the skull are not included in this system because their natural history, surgical management, and response to treatment are quite different. thus leukemias, plasmacytoma, lymphomas, sarcoma, undifferentiated round cell lesions, Central Library - Ain Shams University Ewing's

and metastatic carcinomas are excluded.

They acknowledged that staging classifications based on description of the extent of disease require a through knowledge of the natural history of the particular cancers to be staged. In addition to anatomical extent, the histopathological analysis and grade of the tumor are other recognized prime determinates of stage.

Although, this system has the merit of taking histological grade into account as a prime factor in the assessment of risk in soft tissue sarcoma, the proposed system incorporates a number of conceptual premise that make its clinical use awkward.

- 1).47% of the 1215 lesions on which the proposed was based were located in the head, neck, retroperitoneum, or other surgically inaccessible site. These lesions present such a different problem clinically, biologically and surgically that they should not be grouped with lesions of the extremity for analysis.
- 2). The division of sarcomas into three histological grades is a histologically nicety. Although it is likely to have a great appeal to the pathologist, it has little to offer the surgeon in terms of surgical guidance because there is no (middle) surgical procedure.

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3). The (T) designation (local extent) represents the size of the lesions. It is believed that size has prognostic significance that is complex composite of anatomical setting, rate of growth, and time to physician intervention.

Since neither growth rate nor time to diagnosis can be quantitated. This variable in the system of the American Joint Committee would have more relevance if it is reflected to the extent defined by anatomical setting.

That is, compartmentalization (or compartmental escape). This designation is more consistent with the natural histological behaviour of the sarcomas and has meaning for the surgeon.

- 4).A tumor that grossly invade bone, major vessel, or major nerve [Russel, W.O. et al., 1977]. T3 is a poorly defined criterion, and the methods by which these judgments are to be made are not defined. Lesions with such involvement are assigned to a higher stage without regard for grade.
- 5).Lesions of certain histogenisis (synovial sarcoma) or angiosarcoma are assigned to a high stage because of the usually poor prognosis. This is a function of grade and should be treated as such occasional lower grades of these lesions do occur, and should be staged accordingly Library Ain Shams University

Although there is a substantial body of evidence indicating that the initial surgical procedure is a key factor in the survival of patients with soft tissue sarcoma. The American Joint Committee System takes no account of and is not designed to facilitate surgical planning.

Although the system proposed by Hajdu takes the site of the lesion into account, the division into superficial and deep categories does not substantially contribute to surgical planning.

The biological behaviour and principles of surgical management of bone and soft tissue sarcoma are essentially the same. Therefore, it is logical to use a common staging system that also would allow comparison of histogenic types.

The staging system for soft tissue sarcomas proposed by American Joint committee in 1977 and the recent modification suggested by Hajdu have been of limited value in the surgical management of soft tissue lesions [Storm, F.K., et al., 1980]. Specific histogenesis has little bearing on the definitive surgical management of musculoskeletal sarcoma [Clark, R.L., et al., 1957; et al., 1976]. Copeland, $M \cdot M \cdot$ rather the usual determination of selection of a procedure is accomplished in influenced by the anatomical setting of the lesion [Rosen, et al., 1976; Storm, F.K., et al., Wanebo, H.J., et al., 1973] and has to do with Central Library - Ain Shams University 1980:

whether the lesion is confined within well defined anatomical compartments of its diffusely infiltrating through ill defined adventitial planes and spaces [Bowden, et al., 1958; Clark, R.L., 1957; Enneking, W.F., in press; Pack, G.T., and Ariel, I.M., 1952; Sanerkin, N.G., 1980]. Although size is a factor in surgical planning it is not the dominant one. A common surgical staging has been developed for both bone and soft tissue sarcoma. It is clear cut, straight forward and clinically practical because it relates the stage of the disease to selection of surgical procedure and adjunctive measures. [Enneking, W.F., et al., in press] The system has three stages:

- I. A low grade lesion without metastases.
- II. A high grade lesion without metastases.
- III. A lesion either grade with regional or distant metastases.

The low-risk stage I lesion may be of any histogenic type. They are reasonably well differentiated and have a low mitotic rate and moderate cytologic atypia.

The high-risk stage it lesion, also of any histogenic type are poorly differentiated and have high mitotic rates, increased cellularity and cytological atypia, necrosis and vascular invasion. In some tumors, the roentgenographic and clinical aggressiveness is also taken into account and contributes to the assessment of the surgical grades. [Sanerkin, N.G., 1980]

The two stages just described are further divided by the anatomical setting of the lesion that is whether it is intracompartmental or extracompartmental.

Intracompartmental lesions are confined within the boundaries of well defined anatomical structures, this is a bone, joint or fascially defined compartment of a functional muscle group.

Extracompartmental lesions either arise within or secondary extend into extrafascial spaces or planes that have no natural anatomical barriers to extensions.

Both detailed pathological examination of specimens and surgical exploration have confined that the clinical distinctions between intracompartmental and extralesions compartmental may reliably be made preoperatively by the relevant combinations of careful physical history. examination, roentgenography. tomogram, angiogram, computarized tomography scans, radionuclide scans, and other specilaized studies.