Colorectal cancer: the relationship of staging to survival A cancer registry study of 800 cases in St. Gallen-Appenzell

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Historical facts on colorectal staging

The rationale of the heading dates back to over 50 years, when DUKES introduced a staging system for rectal carcinoma. He distinguished three categories which have proven to be of value in the prognosis [1]. Dukes' experience, modified in *figure 1* to *Kaplan-Meier* survival curves [2] shows distinct outcome differences: 44, 37 and 3% respectively at 3 years corresponding to the extent of tumor spread.

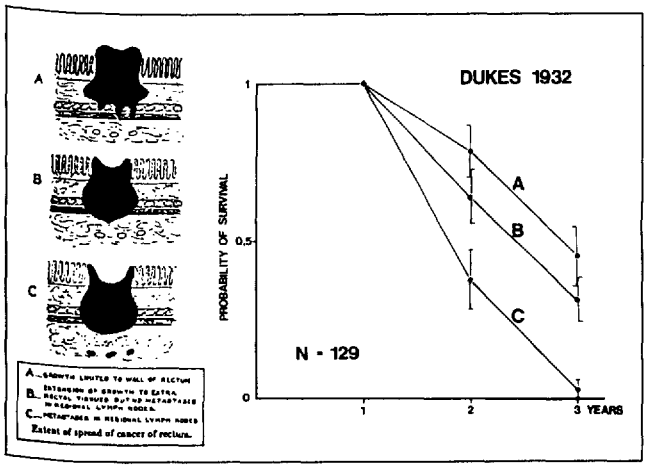

Fig. 1: Dukes' original anatomical sketch.

It has been this classic A-B-C breakdown which has become the best known system for staging rectal, and later on, colon cancers. However, there are some limitations, the main one being the lack of a special category for locally incurable tumor or for distant metastasis.

Many attempts have been made to modify Dukes' classification, even by himself. Up to the fifties, this development had been one of A, B and C [3]. In 1967 *Turnbull*, basically keeping Dukes' system, added the fourth stage D to identify incurable patients with residual cancer after bowel resection [4]. The importance in separating a stage D was that it allowed for a truly clinico-pathological evaluation for the first time which crept into popular usage. In any case, simplicity has been lost and knowing exactly what is meant can be confusing. During the seventies, several papers addressed the dilemma of either universal acceptance resulting in wide misunderstanding, or misusing Dukes' original proposal with its modifications [5, 6].

The TNM-classification, a system of clear definitions, avoids the overlap and confusion of the ABC-designation. In stage IV, it allows for the addition of clinical input too. But it is somewhat cumbersome and difficult to recall without constant referral to notes and therefore is not used by many clinicians.

Nevertheless, there are doubtless clear objectives for doing the best possible staging, whether for planning further therapy or for evaluating overall results. Thus the Australian clinico-pathological staging system (ACPS) has recently been proposed [7]. It utilizes all information available–before a stage is defined. It is also indicated by the letters ABC, corresponding to Dukes. Category D is used when there is clinical or microscopic evidence of residual tumor either locally or at a distance. The system allows the classification of all patients, whether they are treated by curative resection, palliative surgery, local excision, or not at all. Precise definitions are mandatory for successful application of the ACPS.

Tumor location, sex and age in the St. Gall-Appenzell study

We reviewed the histology reports of almost 800 patients with proven colorectal carcinoma and resected

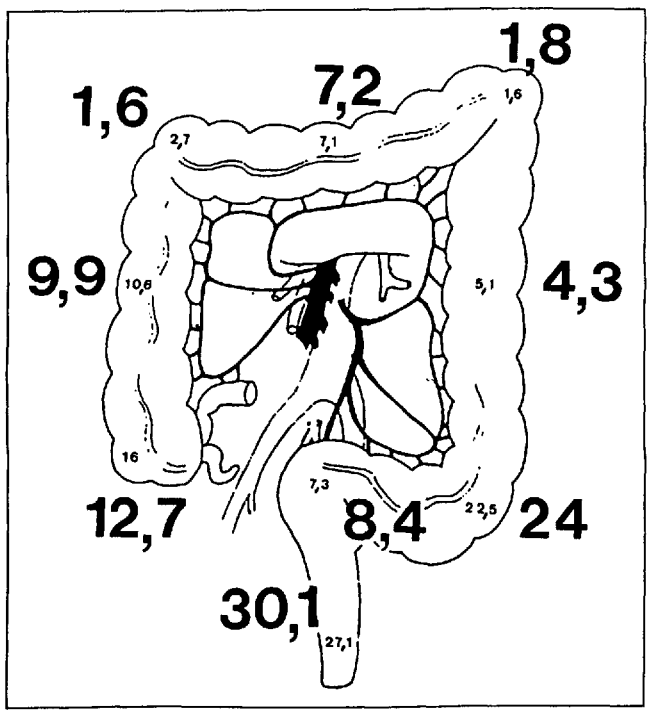

Fig. 2: Percent distribution of 797 colorectal cancers according to location. The small numbers indicate the percentage of a total of 370 patients more than 70 years old.

with curative or palliative intention between 1972 and 1983. Overall there were 52.4% males and 47.6% females. Follow-up information was obtained prospectively at regular intervals of 1, 3, 5 and 10 years. After curative resection, 56% of all survival data are censored. The survival curves are uncorrected.

The anatomical subgroup location is given in *figure 2*. Using them resulted in low patient numbers in certain categories, thus not permitting a conclusive survival analysis. As previously done by others, we therefore divided the patients into a right colon group including the transverse colon (31%), a left colon group ending at the sigmoid (30%) and a rectum group including the rectosigmoid segment (39%).

In the right colon, primary tumors are less frequently found in men than in women, the latter being over 70 years old in 45%. The primary in the rectum shows the opposite ratio *(table 1)*.

Table 1:

LOCATION	N = 797	% ♂	% > 70year	% ♀	% > 70year	RATIO
RIGHT COLON	250	26,8	27,3	36,4	45,1	1 : 1,2
LEFT COLON	240	30,9	35	29,3	23,7	1 : 0,9
RECTUM	307	42,3	37,7	33,3	31,2	1 : 0,7
	mean age	66,7 ± 10,6		67,8 ± 11,7		

With increasing age, women demonstrate an increasing frequency of right-sided tumors. In contrast, in men this trend seems to be the other way round (table 2).

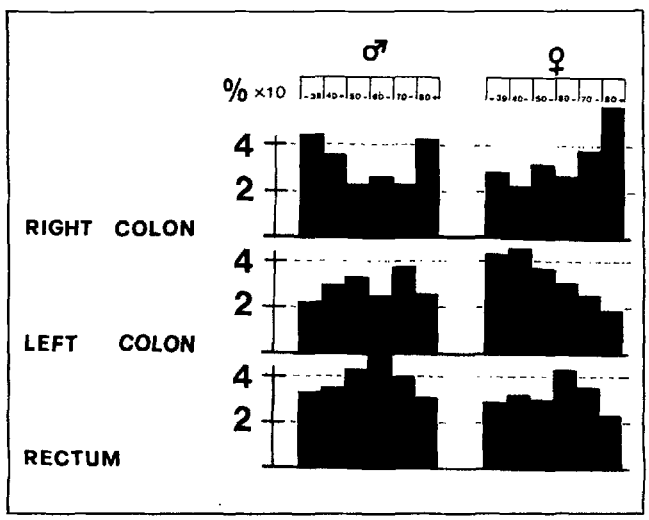

Table 2: Percent age distribution in 10 year groups relative to location and sex.

Survival results and staging

There are more than a dozen district hospitals which send operative specimens to the department of pathology. Therefore the intention is not to stress the better or maybe the worse results in this northeastern part of Switzerland, the surgeons there not being specially trained for colorectal surgery. Rather, the study is concerned with the relationship between staging systems and survival.

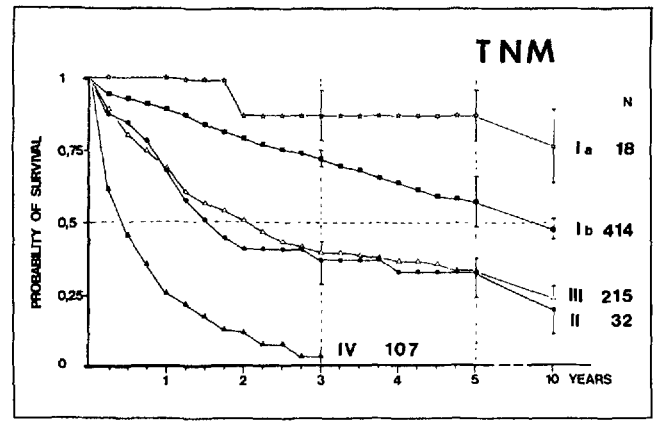

Fig. 3: Survival based on TNM-classification.

In the TNM staging a difference is readily noted between stage Ia and Ib *(fig. 3)*. However, between stage II and III there is no significantly different survival in the cohort, stage III (any T but in addition with involvement of regional lymph nodes) being even better than stage II (spread into adjacent organs).

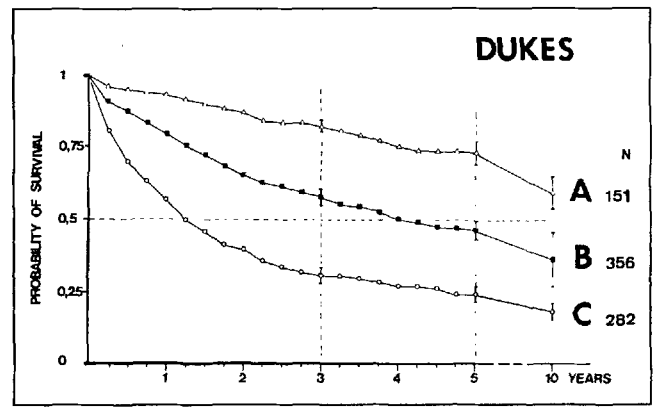

Fig. 4: Survival based on Dukes' classification.

The analysis with regard to Dukes' classification shows the 3 stages nicely separated, the median survival in B and C-cases being 17.1 and 5.9 months respectively *(fig. 4)*. The 3-year survival rate in B and C-stage is only 59 and 31% respectively. The reason for the poor prognosis in these 2 groups of patients is that 16% of the B-cases and 30% in the C-stage cohort are known to be incurable from a clinico-pathological point of

view *(table 3)*. In his series, *Newland* found roughly the same distribution of incurable patients in Dukes' stages A, B and C [8].

INCURABLE CASES IN DUKES' STAGES

DUKES' STAGE (N)	REASONS for INCURABILITY			% Known to be INCURABLE	
	local tumor remaining	distant metastases	both	ST.GALL N = 795	NEWLAND N = 503
A (153)	-	3	3	2	1,8
B (359)	22	37	59	16,4	16,6
C (283)	25	59	84	29,7	36,8

Table 3: Distribution of incurable cases in Dukes' stages A, B and C.

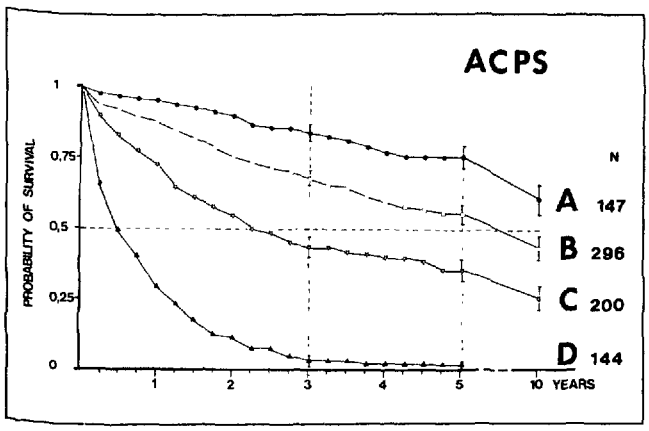

Fig 5: Survival based on ACPS-System.

Exclusion of these 146 (18%) incurable cases and putting them in a stage D according to the ACPS model yielded significantly better results at 3-years: in B-cases 70% ($p < 0.05$) and 44% in C-cases ($p < 0.01$) with a median survival of 24.3 and 9.9 months respectively *(fig. 5)*.

The survival curves with regard to the 3 combined anatomical categories are depicted in *figure 6*. The results provide some surprises insofar that only the B-stage right colon group survival is significantly better than the comparable rectum group ($p < 0.05$). Literature reports analysing the significance of tumor location have been limited so far and have produced widely divergent results. In contrast to older statements, the findings from the recent NSABP clinical trial showed that tumor location proves to be a strong prognostic discriminant [9]. Examining slightly more than 1000 patients–only so-called curable Dukes' B and C-cases

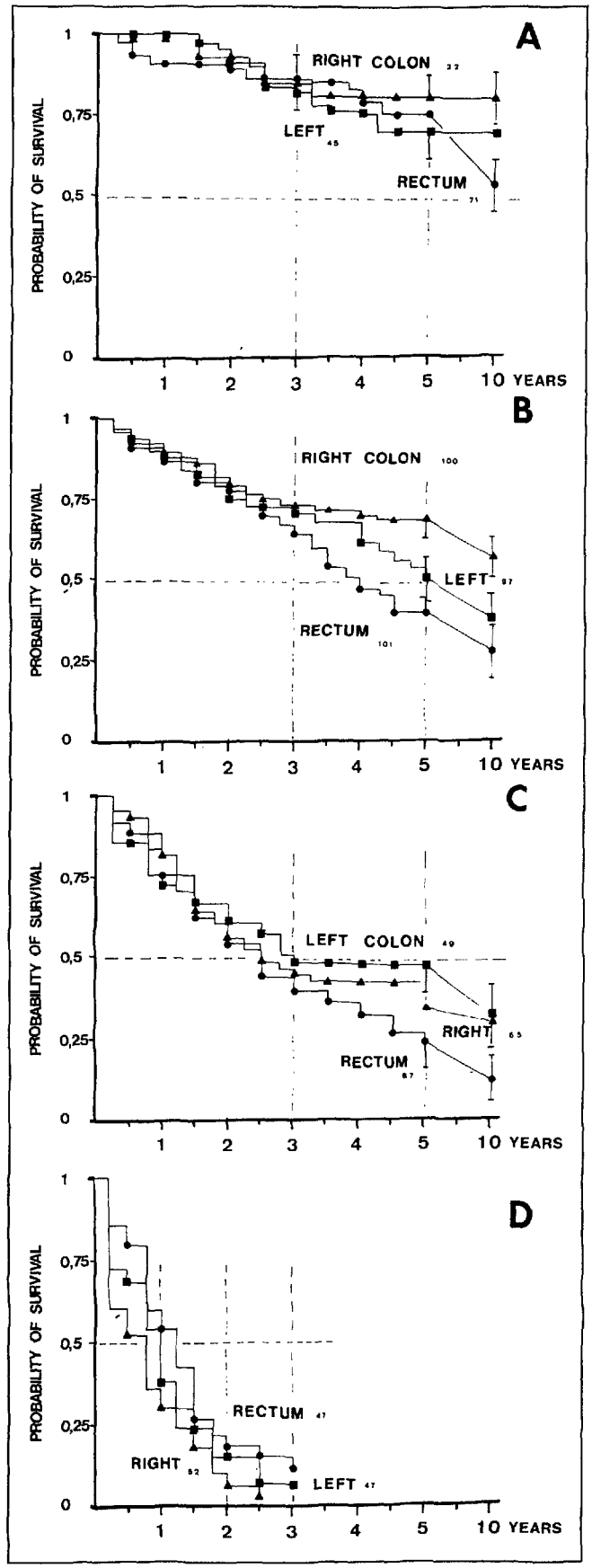

Fig. 6: Survival by different anatomical sites in relation to ACPS-staging.

surviving the operation and the transverse colon alloted to the left colon group–the authors demonstrated the most favorable prognosis for left colon tumors. Rectal cancer had the worst with the relative risk of treatment failure for the latter being over threefold that of the left colon.

Summary

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Proper classification of colorectal cancer has been critical in determining prognosis. Dukes' staging and its modifications have created considerable confusion. The TNM system has never been widely accepted because of its complexity. The Australian clinico-pathological staging (ACPS) system corresponds closely to Dukes' A, B, C-classification, but it differs from Dukes' in separating a stage D for incurable metastatic disease. Evaluating the compatibility of these 3 different staging systems,a survival analysis is presented of a group of 800 non-selected patients, resected in curative or palliative intention and compiled from the cancer registry of St. Gall-Appenzell. The prognostic importance of accurate staging for colorectal cancer is confirmed. No matter which system is used, in order to give realistic statements it must be based on tumor penetration, lymph node involvement and distant metastasis.

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Erfahrungen mit der Früherkennung des Kolon- und Rektumkarzinoms in der Bundesrepublik Deutschland – epidemiologische Gesichtspunkte

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Im Jahre 1977 wurde aufgrund einer gesetzlichen Regelung die kostenfreie Früherkennung von malignen Neubildungen des Kolons und Rektums eingeführt. Die Diskussion über den Erfolg oder Misserfolg bzw. die fragliche Effektivität der Früherkennungsmassnahmen gerade für diese Krebsarten hat zu einem Expertenstreit geführt, in dem jeder zusätzliche Beitrag natürlich besonders aufmerksam betrachtet wird. Die Trends der Mortalitätsdaten, die im Rahmen des Krebsatlas der Bundesrepublik für die letzten 30 Jahre bearbeitet wurden, zeigen ein Absinken der Mortalität für beide Geschlechter und beide Krebslokalisationen, womit eine Stellungnahme zur Effektivität zwar besonders zeitgerecht, aber dennoch schwierig ist [1].

Hintergrund der Früherkennungsprogramme

Für eine effektive Früherkennung von Krankheiten in der Bevölkerung muss eine ausreichend hohe Beteiligung an den Untersuchungen stattfinden. Dies ist eines der Postulate, die von Experten im Auftrag der WHO und der UICC kürzlich zum wiederholten Male zusammengestellt wurden [2]. Selbstverständlich ergeben sich für jede für ein Screening ausgewählte Krankheit grundsätzliche Prinzipien für bestimmte Massnahmen, und im Falle der malignen Tumoren des Darmes und des Mastdarmes ist die Frage zu stellen, welche Früherkennungsmassnahme am effektivsten, effizientesten und die zuverlässigste ist. Eine positive Nebenwirkung gross angelegter Aktionen wie dem in der