The polyp story

B. C. MORSON
V.R.D., M.A., D.M., F.R.C.P., F.R.C.S.

Department of Pathology, St Mark's Hospital, London EC1V 2PS

'Clear and precise definitions of diseases, and the application of such names to them as are expressive of their true and real nature, are of more consequence than they are generally imagined to be: untrue or imperfect ones occasion false ideas; and false ideas are generally followed by erroneous practice.'

Sir Percival Pott, 1765, in
a treatise on fistula-in-ano

Introduction

The little word 'polyp' has probably caused as much confusion as any other commonly used in modern medical nomenclature. Indeed, it has been used with such diverse meaning as to create barriers of misunderstanding which in turn have adversely affected the care of patients. Precision in the use of words, without being pedantic, is clearly desirable but attempts to reach general agreement about how the meaning of a word (and its synonyms) is to be conveyed can be fraught with controversy. That august body, the World Health Organization, among others, has spent large sums of money arranging for experts from all over the world to gather together for discussions on the nomenclature and classification of disease which, in the experience of this writer, can be somewhat acrimonious and consensus of opinion may be difficult or impossible to achieve. The end result is more likely to be a reflection of majority opinion rather than universal agreement. The 'polyp story' is a good example of how one word used with different meaning can create such confusion and misunderstanding that meaningful communication between its users may breakdown.

What is a polyp? Sir John Bland-Sutton, one of the great Surgeon-Pathologists of the early 20th Century, was among the first to emphasize that the word polyp had no place in tissue (histological) diagnosis. He pointed out that 'the ancient name polypus applied to benign tumours attached to mucous membrane by means of a stalk has merely a clinical value' (Bland-Sutton, 1922). But he also made a clear

distinction between a stalked polyp and a sessile papilloma, a notion which is no longer acceptable in modern nomenclature and classification of colorectal tumours, although there are still surgeons, and even pathologists, who find difficulty in understanding why the name papilloma should be abandoned for the newer expression 'villous adenoma'.

It was really Westhues in his exquisitely illustrated monograph who laid the foundation for the modern nomenclature and classification of benign tumours of the colorectum (Westhues, 1934). He was a surgeon, like Bland-Sutton, who recognized the importance of morbid anatomy and histopathology in surgical practice. He studied the cellular detail of what are now known as the neoplastic group of polyps (Table 1) because he recognized their malignant potential. The beauty and accuracy of his illustrations cannot be bettered for their contribution to the morphological aspects of what is nowadays known as the adenoma-carcinoma sequence.

In recent years the word polyp has become increasingly used by surgeons, endoscopists, radiologists and histopathologists as applicable to any apparently benign lump or tumour which is sharply demarcated, circumscribed and projects from the surface of the gastrointestinal mucous membrane regardless of its size and the presence or absence of a stalk. The recognition of such a *clinical entity* must be backed by a *histopathological classification* of the different varieties of polyp because it is the microscopic type which dictates the treatment of the lesion and future management of the patient. Increasingly more responsibility rests today on the opinion of the histopathologist but it must be remembered that his opinion is essentially subjective and is just as prone to error as any clinical opinion at the bedside. For this and other reasons it is as important as ever that clinicians should have a sufficient knowledge of histopathology to challenge a pathologist's opinion and histopathologists have sufficient clinical and surgical training to understand how their use of words, particularly in the form of a written report, influence clinical practice. Careless use of words can lead to serious errors in patient care.

Histological classification of colorectal polyps

Westhues was among the first to identify what he called the 'hyperplastic' polyp which is a very common, small but wholly benign lesion without malignant potential. It is remarkable that his views took many years to percolate through to general acceptance among surgeons and pathologists who persisted in the unitary concept that all 'polyps' had malignant potential. In the early 1960s the author coined the term 'metaplastic' as a synonym for 'hyperplastic' polyp (Morson, 1962) in order to emphasize its essentially benign and non-neoplastic nature. At this time there were many who regarded the hyperplastic polyp as precancerous and although its pathogenesis is unknown, it is widely regarded today as without malignant potential.

The past three decades have seen the emergence of two other histological types of intestinal polyp which have considerable clinical and research interest. These are the juvenile polyp and the Peutz-Jeghers polyp both of which have been confused with the adenoma. Their precise nature is not fully agreed but many regard them as essentially hamartomatous lesions and therefore non-neoplastic. Yet in the form of juvenile polyposis and Peutz-Jeghers polyposis they do seem to have malignant potential although the magnitude of risk is small compared with that in classical familial polyposis (adenomatosis) which has a virtual 100% risk of cancer if left untreated. But even the anatomical definition of this disease has received a jolt in recent years with the discovery that about 50% of affected patients are liable to the development of small intestinal adenomas particularly in the duodenum and ampulla of Vater—hence the risk of ampullary carcinoma among affected patients in polyposis families. The definition of Gardner's syndrome and its distinction, if any, from classical polyposis coli, continues to be debated. These problems are also important for genetic studies because the separation in terms of mode of inheritance of juvenile polyposis, Gardner's syndrome and adenomatous polyposis coli is seldom straightforward. Like 'polyp' the word 'polyposis' has only importance as a clinical or gross description of many polyps and has no place in histological diagnosis. How many polyps makes polyposis is a question which we can answer, using only very arbitrary criteria. There is a promising future for research in the field of histopathological and genetic studies of the polyposis syndromes.

The recognition that colorectal polyps can become malignant goes back over one hundred years to the time of Virchow who made the fundamental distinction between cellular changes that are 'atypical' and pre-dispose to malignancy and those which are regenerative or 'reactive', the consequence of healing. The concept of the 'malignant polyp' has clinical as

well as histopathological value but traditionally it is applied to malignant change in a polyp on a stalk. This conception, now considerably modified, was illustrated by Cuthbert Dukes as the 'rake's progress' (Fig. 1). Dukes, perhaps influenced by his experience of the pathology of tumours of the urinary bladder, held to the traditional distinction between a polyp and a papilloma, although he recognized the malignant potential of both.

In the 1950s and 1960s an attitude developed in the United States that 'polyps', even a few of them, were indicative of an unstable colorectal epithelium which was at high risk of developing carcinoma. There were some prominent surgeons who proposed total colectomy and ileorectal anastomosis for such patients. This provoked the pathologists Lauren Ackerman and Benjamin Castleman (Castleman and Krikstein, 1962; Spratt, Ackerman and Moyer, 1958) to present an opposite view namely that 'adenomatous polyps' had no malignant potential although they agreed that villous adenomas had significant potential for cancerous change. These conflicting attitudes have been overtaken by events, such as the WHO Classification of Intestinal Polyps and the unitary concept that the polyps recognizable microscopically as adenomas were one disease (epithelial dysplasia) which could present as any one of these structural types. In other words, the adenomatous polyp (tubular adenoma) was fundamentally the same biological disorder as a villous adenoma (villous papilloma).

During the past twenty years a consensus has gradually been reached among pathologists which culminated in the publication of the WHO blue book on the Histological Classification and Nomenclature of Intestinal Tumours (Eds. Morson and Sobin, 1976). This classification and recommendations for nomenclature has turned out to be an important milestone in our understanding of the diagnosis and treatment of colorectal polyps and polyposis which is summarized in Table 1. The main virtue of this classification is not so much the recognition of the different histological types of intestinal polyp but the identification of the adenoma as the only variety with significant malignant potential. But what is an adenoma?

Adenoma and carcinoma

Colorectal adenomas, and indeed the much less common adenomas of the stomach and small intestine, can be defined as well demarcated, circumscribed lumps of epithelial dysplasia (atypia) with or without a stalk, usually polypoid but occasionally flat, which can be categorized into three histological types: tubular, tubulovillous and villous (Table 2). The histology of these three types of adenoma has

TABLE 1. Histological classification of colorectal polyps

	Single	Multiple (polyposis)
Neoplastic	Adenoma <ul style="list-style-type: none">TubularTubulo-villousVillous	Familial polyposis coli
Hamartomatous	Juvenile polyp Peutz-Jeghers polyp	Juvenile polyposis Peutz-Jegher's syndrome
Inflammatory	Benign lymphoid polyp	Inflammatory polyposis (e.g. in non-specific and specific forms of inflammatory bowel disease) Benign lymphoid polyposis
Unclassified	Metaplastic (hyperplastic)	Metaplastic (hyperplastic) polyposis

FIG. 1. The Rake's Progress—origin and spread of carcinoma in rectal polyps (after Cuthbert Dukes).

been well documented but is important to remember that these are not clear cut categories, but only different manifestations of a spectrum of abnor-

mal tissue architecture (Konishi and Morson, 1982). The older synonyms such as villo-glandular adenoma and villous papilloma are being abandoned

TABLE 2. The neoplastic polyps

Adenoma—	Tubular adenoma (syn. adenomatous polyp)
	Tubulo-villous adenoma (syn. villo-glandular adenoma; papillary adenoma)
	Villous adenoma (syn. villous papilloma)

although adenomatous polyp is still commonly used. It would be better to reach uniformity in practice by using the recommended WHO Classification.

The cellular changes in adenomas are the same whatever the histological type and can be graded subjectively into mild, moderate and severe dysplasia, the latter being closest to invasive carcinoma. Severe dysplasia is used synonymously by some with the expression carcinoma-in-situ but the author has always held the view that the latter term is emotive and can label a patient as having 'cancer' when such a serious diagnosis is unjustified. For many patients the words cancer or carcinoma however qualified can create fear and loss of hope and certainly a word that should be avoided when dealing with a lesion which is known to be easily curable by local removal. Although there are differences the cellular features of dysplasia in adenomas have much in common with the dysplasia seen as a consequence of long-standing ulcerative colitis, in the mucous membrane of the stomach and in the squamous mucous membrane of the oesophagus. Moreover, the word dysplasia has general applicability in the description of histopathological precursor lesions for cancer in a variety of epithelial surfaces both within and without the gastrointestinal tract. Dysplasia of the uterine cervix is the best known example. Conceptually it now appears advantageous to think in terms of the dysplasia-carcinoma sequence in the gastrointestinal tract rather than the polyp-cancer or adenoma-carcinoma sequence.

The importance of the adenoma lies in its role as a marker of increased colorectal cancer risk. It is a common lesion in those western countries, particularly the United States, where the incidence of colorectal cancer is high. For some years now there has been general acceptance of the concept of the adenoma-carcinoma sequence, although it must be emphasized that only a minority of adenomas are destined to become cancerous and the time sequence of adenoma to carcinoma may take many years. Probably this is always at least five years and in some patients may be as long as a quarter of a century (Muto, Bussey and Morson, 1975). The magnitude of risk for cancer varies with the size, histological type and grade of dysplasia of the adenoma, but particularly the numbers of adenomas produced by the

patient. There is no better example of very high cancer risk than in the genetically pre-determined disease of familial polyposis in which the colorectal mucosa is covered by uncountable numbers of adenomas. It is very rare for other patients to have more than 50 adenomas and less than thousands. Most have one only or less than ten and to have between 20 and 50 at any one time is uncommon. On the other hand, recent endoscopic experience suggests that there are patients who could be called 'adenoma producers' in that they are prone to recurrence of these tumours over periods of time to be measured in years. They almost certainly have a greater magnitude of risk for cancer than patients with solitary lesions.

The concept of the adenoma-carcinoma sequence has been used by some to justify short interval (even as little as three months) colonoscopic surveillance despite the evidence that generally the evolution of the sequence is slow. Thus, the discovery of a 'polyp' continues to be used by some as an indication for frequent endoscopic examinations. The fact is that at the present time we do not know how frequently examination should take place, and until more selective and sensitive markers of cancer risk are available it is best to adopt a cautious approach to the management of adenoma patients. This type of polyp is so common that it is not practicable or cost effective to subject all such patients to follow-up and repeated investigation. Prospective studies are required which hopefully will identify small, manageable groups of patients at especially high risk and it is these who would be most likely to benefit from any long-term cancer prevention programmes.

The notion that the removal of adenomas can be equated with prevention of bowel cancer is theoretically correct, but there is no justification at the present time for regular and indefinite endoscopic follow-up of all adenoma patients over many years (with the attendant risk of inducing cancerophobia) other than as a research project in special centres. Moreover, indiscriminate follow-up of this kind is expensive and wasteful of medical expertise. It is unfortunate that the words 'polyp' and 'adenoma' have acquired an emotive meaning for both doctors and patients which is out of all proportion to the reality of the situation. These comments are not designed to inhibit attempts at prevention of bowel

cancer in *individual* patients if there is sufficient justification, but there is real danger that over-reaction will lead not only to unnecessary investigation of patients but will harm attempts to design meaningful cancer prevention programmes.

The introduction of fiberoptic colonoscopy has been revolutionary in its effects. Not only is it a highly successful weapon for the removal of polyps from all parts of the large bowel but it has provided pathologists with an abundance of material for study. There is now a real chance that prospective studies will give a clearer picture of the magnitude of cancer risk, for different groups of patients with different histological types and numbers of adenomas. However, research using the techniques of cytogenetics, cell culture and immunocytochemistry among others may well produce in the future those highly selective markers of cancer risk which are required if organized cancer prevention in clinical practice is to become a reality. Meanwhile, the recognition of a polyp or a state of polyposis by endoscopic and radiological techniques must be followed by accurate histological typing and the use of agreed nomenclature which is meaningful to those who have care of patients.

Acknowledgment

Sir Francis Avery Jones was, among physicians, a pioneer of proctosigmoidoscopy and rectal biopsy for inflammatory bowel disease but he also has a general interest in the value of histopathology and its application to clinical studies. The author most gratefully acknowledges his support and encouragement over many years.

References

- BLAND-SUTTON, J. (1922) *Tumours innocent and malignant, their clinical characters and appropriate treatment*. 7th Edition, Cassell and Company Ltd., London, New York, Toronto and Melbourne.
- CASTLEMAN, B. & KRIKSTEIN, H.I. (1962) Do adenomatous polyps of the colon become malignant? *New England Journal of Medicine*, **267**, 469.
- KONISHI, F. & MORSON, B.C. (1982) Pathology of colorectal adenomas: a colonoscopic survey. *Journal of Clinical Pathology*, **35**, 830.
- MORSON, B.C. (1962) Some peculiarities in the histology of intestinal polyps. *Diseases of the Colon and Rectum*, **5**, 337.
- MORSON, B.C. & SOBIN, L.H. (Eds) (1976) *The Typing of Intestinal Tumours*, Volume No. 15, World Health Organisation, Geneva.
- MUTO, T., BUSSEY, H.J.R. & MORSON, B.C. (1975) The evolution of cancer of the colon and rectum. *Cancer*, **36**, 2251.
- SPRATT, J.S., ACKERMAN, L.V. & MOYER, C.A. (1958) Relationship of polyps of the colon to colonic cancer. *Annals of Surgery*, **148**, 682.
- WESTHUES, H. (1934) *Die pathologisch-Anatomischen Grundlagen der chirurgie des rektum karzinoma*. George Thieme Verlag, Leipzig.