The role of tumour markers in surgery

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This essay briefly outlines immunologic conceptsas they relate to the aetiology, diagnosis and followup of tumours. The specific' clinical indications foruse of individual, tumour markers, particularly thosecurrently in clinical use are discussed.The physical examinatipn and standard diagnosticradiologic procedures have serious limitations in theearly detection and localization of small tumour masses.In a neoplasm of 1 cc, a realistic limit of clinicalscreening, has already completed approximately 30doublings or two thirds of its growth.It contains one billion cancer cells and viablecells are likely to have been shed into the blood streamor lymphatic system.In addition, in a human body composed of 10 to14 trillion cells, harassed by environmental carcinogens,somatic mutations occur at conservatively estimatedrate of 10-5 per gene per cell cycle.Assuming that only a minute fraction of aberrantcells will enter mitosis, the chance for the outgrowthof a potentially dangerous variant is nonetheless quiteformidable. This ever-present threat is minimized byeffective self-screening mechanisms.-113There is a substantial body of evidence showingthat some defect in immune surveillance permits thedevelopment of cancer or at least hampers their eradication.There have been sporadic attempts to influencethe outcome of tumours by manipulating immunologic mechanisms.The rapid expansion of knowledge about immunologyin recent years has been accompanied by increased interestin the role of immunology in the development and progressof cancer.Despite an early diagnosis and surgical removal,the patient may have many undetected microscopic metastases.In patients with intr-abdominal malignancy, itis often difficult to assess disease prognosis andresponse to treatment.Research has therefore been directed towards theidentification of tumour-specific products in the bodyfluids, i.e., (Tumour markers, which are any chemicalor biological factor that identifies the presence ofa tumour or its reccurrence).Markers are usually evaluated in terms of specificityand sensitivity. That is conside~ed in lightof whether they are elevated in the serum, body fluids,or tissues of patients with only a specific tumour orwith any of a related of malignancies.-114If a marker is elevated above a normal level underconditions where the particular neoplasm is not presentthe result is called a false-positive value and thespecificity of the assay is weakened, similarly, whenthe specific -tumour being sought is present and amarkerdoes not rise above a norm, a false negative resultis obtained and the test is said to lack sensitivity.An .ideal marker not only should signal the presenceof microscopic tumour but also should define the siteand morphologic type of the malignancy.The requirements for a marker vary depending onthe specific application intended for the marker_thereare six major

areas of possible use of tumour markers.These are screening in the general populationor high-risk groups, diagnosis or detection in symptomaticpatients, staging or stratification, determination ofadequacy of therapy, monitoring for recurrence and monitoringfor response to radiation, chemotherapy or othertreatment. Also tumour markers have been used as definitivetests through which a clinician can decide to start,continue or withold treatment and it is influenciedby serial determination of the levels of a tumour marker.There is a long list of possible useful markersand new ones are constantly appearing.-115There are many affirmative statements about theirusefulness. In general, these tumour markers can beclassified into 2 groups: hormonal products and proteinproducts of the tumour. The hormonal markers tend tobe more specific and are therefore usually more usefulin the clinical setting. The protein products of tumours,many of them are identical to embryonal products andsome are enzymes.Because of the unpredictable occurrence of anelevation of a single tumour marker in a particularindividual, some researchers have suggested that multiplemarkers be evaluated in each tumour patient.So, the best biological diagnosis of the neoplasticprocess depends on the simultaneous measurement of aselected group of these markers.