migrants to Israel was of particular interest. The Agency has been especially active in the fields of asbestos carcinogenesis, liver cancer,¹ and cancer of the oesophagus.

Events have partly overtaken the Agency’s efforts to determine whether DDT is a carcinogen for man or not. Exposure of mice to diets containing DDT increases the risk of their developing liver tumours, but the results are difficult to interpret because mice of many strains, especially males, are peculiarly prone to develop liver tumours. Moreover, DDT appears to decrease the risk of the development of other tumours such as lymphomas. An experimental study on rats is not sufficiently advanced for any conclusion to be drawn. Meanwhile the use of DDT has been banned in the United States. In many parts of the world where the Agency and W.H.O. operate DDT is an important weapon against malaria and various insect pests. Banning its use in such areas would seriously increase the risk of non-neoplastic disease and decrease food production. At present the cancer hazard for man from DDT is purely theoretical. On the basis of a preliminary evaluation of its own field studies the Agency has concluded that there seems to be “no correlation between DDT exposure and primary liver cancer or cancer at other sites.” It will be interesting to see what stand the Agency and W.H.O. take in relation to DDT.


Thymectomy for Myasthenia Gravis

The discovery of an association between the thymus and myasthenia gravis was originally based on two findings. Firstly, A. Blalock and colleagues¹ found in 1936 that thymectomy in a myasthenic patient led to a considerable improvement in her symptoms. Secondly, patients with the disease were found to have in common a histological change in the thymus. This was the presence of germinal centres and plasma cells in the gland, suggesting an immune response in the thymus, which does not normally show one.

Germinal centres and antibody production in the thymus can occur in animals if the antigen is directly injected into it. Moreover, the offspring of myasthenic mothers have transient myasthenia from birth, which disappears within a few weeks. Apparently there is a transmissible agent able to cross the placenta and cause the disease in the infant. The effect lasts long enough to make it unlikely that it is a small molecule, and it is reasonable to suppose, but unproved, that it is an IgG antibody. This would cross the placenta, and the duration of the effect in the child is commensurate with its half life. It thus seems that myasthenia may be the result of an immune response in the thymus leading to the production of antibody which can interfere with neuromuscular transmission.

It is difficult to see how an antibody can interfere directly with the action of a neurotransmitter, as the space across which the transmitter acts is smaller than the diameter of an IgG molecule. Biopsies of myasthenic muscle have shown IgG bound to the muscle in a striated pattern, not associated with the neuromuscular junction. While immunization of animals with thymic tissue results in an antibody with affinity for muscle, the antibody also reacts well with smooth muscle and seems unlikely to have the selective effect of extra fatiguability of voluntary muscle seen in myasthenia. Just as much of the antibody produced may be made at the site of injection of antigen, so the germinal centres in the thymus may be evidence of a local response to local thymic antigen. The nature of the antigen, whether endogenous or an infecting agent located in the thymus, remains completely unknown.

The effect of thymectomy in producing improvement in the disease suggests that the process does not normally exist to any extent outside the thymus. It is now well established that the thymus-dependent lymphocytes which are required for most humoral antibody responses need the thymus in which to mature. Thymectomy in the adult leads to depletion of these cells after about 200 days. The improvement in the disease which frequently occurs sooner than this is unlikely to be due to their depletion; it is more likely that it is due to the removal of the source of production of the antibody itself.

It used to be believed that improvement after thymectomy was seen most frequently in young girls.² Subsequently this was shown to be due to the infrequency of enlargement of the thymus in this group. Thus these girls had total thymectomy, whereas other patients hadenucleation of an obviously abnormal part of the gland from a remainder that was also abnormal. A recent report³ on a large series of treated thymectomy patients shows that the improvement rate is very high when total thymectomy is carried out, though many of the patients did not show improvement for many months after operation. The authors related the rate of response to the number of germinal centres in the gland: the more frequent the centres, the slower the remission. Early or late remissions were stable ones.

It appears that the remissions after surgery in myasthenia may be of two kinds—rapid response by removal of the antibody-producing tissue, and a more delayed response when depletion of T cells in the body prevents the abnormal response in other tissues. Thus thymectomy, which is clearly worthwhile in severe myasthenia, may be both eradicating a localized process in the thymus and in some patients also stopping a more remote production of antibody.

² Eaton, L. M., and Clagett, O. T., American Journal of Medicine, 1955, 19, 705.

Surgical Ritual

In the complex and rapidly evolving organization of modern surgical wards and operating theatres it is inevitable that many procedures have to be made “routine.” Indeed it is highly desirable that patients have routine screening of chest and blood before surgery, that consent forms are signed, that identification labels are firmly fixed, and that a hundred other tasks are performed. Yet a routine must never become a senseless ritual which persists because it has become hallowed by tradition—the tourniquet has at last disappeared from the foot of the bed of every amputation case—and should exist only if it is based on sound reasons which can be easily understood by both medical and nursing staff. As knowledge and techniques advance,