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LIGGING VAN DIE LETSEL IN LONGTERING

Dit was Valsalva wat die aandag daarop gevestig het dat die letsels van longtering dikwels tot die boonste lobbe beperk is, en Morgagni het 'n stap verder gegaan deur aan te teken dat hulle die boonste dele van die lobbe verkies. Laennec het opgemerk dat hulle nie net die bopunte aanval nie maar dat die regterkant meer dikwels aangetas word as die linkerkant. Maar onlangs nog kon Rich konstateer dat dit nog nie moontlik is om die lokalisasie aan die bopunt bevredigend te verklaar nie.

In 1887 het Orth gesuggereer dat daar 'n verband bestaan tussen hierdie lokalisasie en anemie van die longpunt met verminderde limfvorming. Hy het die hoë voorkomssyfer van longtering by pasiënte met stenose van die longslagaarklep aangehaal as 'n argument ten gunste van hierdie teorie. Bloomfield *et al*[1] het hierdie teorie onderskryf toe hulle opgemerk het dat die longslagaardruk te laag was in vergelyking met die swaartekrag om die bloedvloei in die boonste derde van die longe te handhaaf wanneer 'n volwassene sit of staan. Die mening was dat die gevolglike verandering in gasdruk in die aangetaste dele die groei van teringkieme bevorder, maar wat as van groter belang beskou was is die verminderde limfvloei en die staking van toksienverdunning deur plasmafiltraat as gevolg van die verminderde bloedvloei. Dock[2] het dit benadruk dat die waarde van rus in die bed by die behandeling te danke is aan die herstel van die normale vloei in die bodele van die longe.

Die posisie van die liggaam as 'n faktor in die lokalisasie van die siekte, moontlik as gevolg van veranderinge in gasdruk, word in die laaste tyd benadruk.

Aldus het Medlar[3], in proefnemings met beeste en konyne, opgemerk dat die letsels in kroniese gevalle in die juxtafreniese deel naby die dorsale oppervlakte van die longe te vinde was. Deur konyne met die kop en skouers na bo te laat hang vir periodes van 11 uur per dag het die letsels hoofsaaklik in die punte voorgekom soos in die mens. Ander het daarop gewys dat in die vlermuis, wat met sy kop na ondertoe slaap, die grootste knoppies naby die middelrif gevind word.

Scott *et al*[4, 5, 6] dink nie dat die verminderde limfvloei van groot belang is nie. Hulle stel voor dat veranderinge in gasdruk wat deur verandering van bloedvloei in die longe geskep word van die allergrootste belang is vir die bevordering van die groei van teringkieme. Hul anastomose-eksperimente het bewys dat ruime volume en hoë druk van die bloed wat die long binnekom geen teëhoudende effek op teringknoppies het nie, so lank as geen deel van die onversadigde bloed wat deur die are

EDITORIAL

SITE OF THE LESION IN PULMONARY TUBERCULOSIS

It was Valsalva who pointed out that the lesions of pulmonary tuberculosis are often confined to the upper lobes, and Morgagni went a stage further by noting that the lesions favoured the upper part of the lobes. Laennec noted not only that they attacked the apex, but that the right apex was more commonly affected than the left. But only recently Rich was able to state that it is still not possible to explain satisfactorily the apical localization of the disease.

Orth in 1887 had suggested that this localization was related to an apical anaemia with reduced lymph formation. He instanced the high incidence of pulmonary tuberculosis in patients with stenosis of the pulmonary valve as a point in favour of this theory. Bloomfield *et al.*[1] supported this theory when they noted that pulmonary arterial pressure was too low in comparison with the force of gravity to maintain the flow in the upper third of the lungs when adults were sitting or standing. The resulting change in gas tension in the affected zones was believed to favour growth of tubercle bacilli, but what was thought to be more important was the reduction of lymph flow and cessation of the dilution of toxins by plasma filtrate as the result of the diminished blood flow. Dock[2] stressed that the value of bed rest in treatment was due to restoration of the normal flow in the upper part of the lungs.

Posture as a factor in the localization of the disease, possibly as a result of changes in gas tension, has been stressed lately.

Thus Medlar,[3] working on cattle and rabbits, noted that the lesions in chronic cases were to be found in the juxta-phrenic region, near the dorsal surface of the lungs. By holding rabbits suspended with the head and shoulders uppermost for periods of 11 hours per day the lesions occurred mainly in the apices, as in man. In the bat, which sleeps with head hanging down, others have shown that the largest tubercles are found near the diaphragm.

The importance of reduction of lymph flow has been minimized by Scott *et al.*[4, 5, 6] who suggest that changes in gas tension created by altered pulmonary flow are of paramount importance in favouring the growth of tubercle bacilli. Their anastomosis experiments have shown that ample volume and high pressure of arterial

van die liggaam na die hart terugvloei die lugsakkies van die long bereik nie. Blykbaar is dit teenstrydig met die teorie dat verminderde bloedvloei met die verminderde limfvloei en verminderde toksienverdunning wat daaraan verbonde is die belangrike faktor in die lokalisasie van die letsel is.

Ook Rich en Follis[7] meen dat gasdruk van groot belang kan word. Hulle het getoon dat teringletsels in marmotjies gestuit kan word deur die diertjies lug met so min as 10% suurstof te laat inasem; en dit ten spyte van die oormatige lugtoevoer wat deur suurstofgebrek en die vermeerderde werk van die longe veroorsaak word.

Dit is bevind dat hidrodinamiese faktore die feit kan verklaar dat aanvangsletsels 50% meer dikwels in die regter bolob as in die linker een voorkom. Die hooflongslagaar, die linkerlongslagaar en die slagaar na die linker bolob loop in 'n meer reguit lyn dan wat die geval is aan die regterkant, waar die regter longslagaar met 'n reghoek wegdraai by die verdeling en die tak na die bolob weer met 'n skerp hoek wegdraai by sy oorsprong. Dus sal die drukking in die regter bolob laer wees dan in die linker een, en die streek van die long met hoë suurstof- en lae koolsuurgasdruk sal dieper aan die regterkant as aan die linkerkant strek.

Die teenswoordige werk wil aandui dat liggings-, hidrostatiese en gasdruk-verskille die lokalisasie van die letsels in die longe bepaal. Die doeltreffendheid van longkollaps as behandeling is moontlik te danke aan die vermindering van bloedvloei en veranderinge in longsuurstof en -koolsuurgas tot die peil van dié in die are. Die hoë voorkomssyfer van longtering in stenose van die longslagaarklep, dielae voorkomssyfer daarvan in myterklepstenose en die doeltreffendheid van platlê in die bed vir die stuiting en herstel van vroeë longpunttering kan moontlik almal deur hierdie faktore verklaar word.

In 'n onlangse referaat het Dock[8] die interessante werk wat gedoen is volledig opgesom. Soos hy aandui het die ontwikkeling van antibiotikas die waarde van rus in die bed vir lang tydperke heelwat gewysig. Mens sou daarby kon voeg dat die stryd teen ondervoeding, oorbevolking en agterbuurtes moet voortgaan as tering uitgeroei moet word.

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blood entering a lung have no retarding effect on tubercles as long as none of the unsaturated blood returned to the heart by the systemic veins reaches the alveoli. This would appear to controvert the theory that diminished blood flow with associated lessened lymph flow and lessened dilution of toxins is the important factor in the localization of the lesion.

That gas tension may be of great importance is also suggested by Rich and Follis,[7] who showed that tuberculous lesions in guinea-pigs can be arrested by making the animals breathe an atmosphere containing as little as 10% oxygen; and this in spite of the hyperventilation caused by the anoxia and the increased work of the lungs. Hydrodynamic factors have been found to explain the fact that the incidence of initial lesions is 50% greater in the right upper lobe than in the left. The main pulmonary artery, the left pulmonary artery and the artery to the left upper lobe are in a straighter line than is the case on the right, where the right pulmonary artery turns at an acute angle at the bifurcation, and the branch to the upper lobe turns at an acute angle at its origin. Thus the pressure head will be lower in the right upper lobe than in the left, and the zone of lung with high oxygen and low carbon-dioxide pressures will extend more deeply on the right side than on the left.

The present work tends to indicate that postural, hydrostatic and gas-tension differences determine localization of lesions in the lungs. Possibly lung collapse owes its efficacy in treatment to the reduction in blood flow and changes of pulmonary O_2 and CO_2 to the levels in venous blood. The high incidence of pulmonary tuberculosis in pulmonary-valve stenosis, its low incidence in mitral stenosis and the effectiveness of lying flat in bed for the arrest and healing of early apical tuberculosis may all be explained by these factors.

Dock,[8] in a recent paper, fully summarizes the interesting work which has been done. As he points out, in treatment the value of bed rest for long periods of time has been greatly modified by the development of antibiotics. One would add that the fight against malnutrition, overcrowding and slum conditions must go on if tuberculosis is to be eradicated.

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ADRENOCORTICAL HYPERFUNCTION

2. ANDROGENS AND MINERALOCORTICOIDS

In an editorial in the last issue of the *Journal* the features caused by an excessive production of glucocorticoid secretion, known as Cushing's syndrome, were considered. The second group of hormones formed by the adrenal cortex are androgens (the 'N' or 'nitrogen' substances of Albright, so-called because of their anabolic activity and hence their tendency to cause nitrogen retention).

The symptoms of the adreno-genital syndrome are

produced by excess of these masculinizing hormones, as is indicated by the finding of a high urinary 17-ketosteroid excretion. As in Cushing's syndrome there may be an adenoma, a carcinoma or bilateral hyperplasia of the cortex to account for the hypersecretion. Where, however, congenital adrenal hyperplasia is present it is considered not to be the basic defect, but rather that an isolated inability to synthesize glucocorticoids is the primary lesion. In these patients the circulating level of 17-hydroxycortosteroids is abnormally low, and there is little or no increase following stimulation with ACTH, whereas the excretion of 17-ketosteroids in the urine is much increased and is even further raised after ACTH administration. [2]

The syndrome may now be explained by invoking the idea of thermostat-like regulation of the pituitary. Normally the circulating glucocorticoids damp down the production of ACTH by the pituitary, which in turn diminishes the stimulation of the adrenal cortex and tends to lower glucocorticoid formation. Thus the body regulates its level of circulating cortical hormones. However, when the glucocorticoids are abnormally depressed, ACTH production is greatly enhanced and the other hormones produced by the adrenal cortex are secondarily increased, particularly the androgens. (The position of the mineralocorticoids is less clear, though in some cases of congenital adrenal hyperplasia they may be deficient, in which circumstances an Addisonian state occurs in combination with the adrenogenital syndrome.) Further confirmation of the above hypothesis is to be found in the effect of administered cortisone or hydrocortisone on the androgen excretion in this syndrome. Not only does this drop to normal levels (as indicated by the urinary 17-ketosteroids) but the patient's symptoms quite rapidly revert to normal in a remarkable manner.[3] On the other hand cortisone has no effect on the syndrome when it is caused by a tumour.

The so-called 'adreno-genital syndrome' really consists clinically of a group of 3 syndromes, one appearing in young girls, one in young boys and the third in older girls or in women. The condition of congenital adrenal hyperplasia in young girls is by far the commonest cause of female pseudo-hermaphroditism. The symptoms are variable and include evidence of masculinization such as an enlarged clitoris, persistent urogenital sinus, and early growth of pubic and axillary hair. Later it is evident that female secondary sex-characters are not appearing, male type of hair grows on face and body, and the voice deepens. Failure of normal salt retention may occur in infancy with death in Addisonian crisis. On the other hand some patients develop hypertension.

Adult females complain of secondary amenorrhoea and sterility and show varying degrees of virilization: growth of hair on face and body but recession at the temples, enlargement of clitoris and thyroid cartilage, deepening of voice, coarsening of features with acne, increase in muscularity. There are, of course, very many women who suffer from hirsutes with masculine distribution of hair (though not usually temporal recession) and who appear to have no underlying endocrine disturbance whatever. On the other hand Kinsell [4] has reported one case in which hirsutes was the sole clinical manifestation of an adrenal cortical tumour (though in the protocol remark is made of great muscular development). The 17-ketosteroid output in this case was between 60 and 90 mg. per day.

In boys the condition of 'macrogenitosomia praecox' is produced—'the pocket Hercules' type. The boys develop a 'pseudo-precocious puberty' with advanced bone age, muscular development, sexual hair growth, penile size and voice change. The testes may be much less enlarged and spermatogenesis is, naturally, not to be expected. As in the females, the 17-ketosteroids are very high, and an Addisonian state may be present in those cases which are due to congenital adrenal hyperplasia.

Finally it may be repeated that hyperplasia or carcinoma of the adrenal cortex may cause a mixed picture of Cushing's syndrome and the adreno-genital syndrome, in which both glucocorticoids and androgens are produced in excess.

The third group of hormones manufactured in the adrenal cortex are the mineralocorticoids, the 'salt-retainers', represented by aldosterone. Excessive production of these substances may possibly account for the hypertension in some of the cases of congenital adrenal hyperplasia. Conn [5] has recently described a condition of 'primary aldosteronism,' in which patients develop intermittent tetany with normal serum calcium, paraesthesiae, periodic severe muscular weakness, polyuria and polydipsia, hypertension without oedema. Biochemically there is hypokalaemia, hypernatraemia, alkalosis and an inability of the renal tubules to reabsorb water. Excessive amounts of a salt-retaining corticoid are found in the urine.

The field is wide open for workers to ascertain what part, if any, aldosterone excess plays in essential hypertension, in the oedema of nephrosis and cirrhosis of the liver, in cardiac failure and in states of 'stress' such as attends a major operation. It is becoming more and more evident that endocrinology will play a fundamental part in explaining the basic features of many syndromes apparently belonging to other specialities.

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