Hospital Topics

Pulmonary Function After Lymphography

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Summary

The effects of lymphography on ventilatory function and gas transfer factor were studied in nine patients. Serial measurements made up to one month showed no change in the forced expiratory volume in one second or vital capacity. A small but reversible fall in transfer factor was found. The greatest reduction was at 24 or 48 hours. It was concluded that patients with normal lungs are unlikely to encounter difficulties but that patients with severe lung disease require careful assessment before lymphography.

Introduction

Lymphography has been used increasingly to investigate the abdominal lymph nodes. It is now part of the routine investigation of lymphomas, such as Hodgkin's disease, and has been useful also in the assessment of pelvic carcinomata and of lymphoedema.

The oil-based contrast medium passes up the thoracic duct with subsequent embolism to the lungs, shown by a fine nodularity of the lung fields on chest x-ray examination. On occasions severe breathlessness has resulted from this investigation.^{1, 2} Previous investigations have shown the transfer factor to be reduced after lymphography,^{3, 4} but the serial changes have not been closely studied. The present study was undertaken to assess the reversibility of the change as well as its magnitude.

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Methods

Nine consecutive adult patients were studied (table I). Eight of these were without respiratory symptoms and had normal or near normal ventilatory function. One patient had chronic bronchitis and old pulmonary tuberculosis and had moderate airways obstruction. Lymphography was performed with iodized oil fluid injection. Between 6 and 7 ml were injected into the dorsum of each foot, the quantity depending on the patient's size and on the degree of early lymph vessel filling in the abdomen.

Forced expiratory volume in one second (FEV₁) and vital capacity (VC) were measured with a wet spirometer (Morgan) and corrected to body temperature, pressure, and saturation. The best of two readings was taken on each occasion. Transfer factor was measured by the single-breath method with carbon monoxide (T_{LCO}). Two determinations were made and the mean was taken. Ventilatory tests and transfer factor were measured on the day before the lymphogram and were repeated after completion of the procedure (between 5 and 10 hours after injection), and at 24 hours, 48 hours, one week, and one month. The chest x-ray appearance at 24 hours was assessed by two of us (J.A.W.W. and A.K.T.) for the degree of nodularity, without knowledge of the changes in pulmonary function.

Results

None of the patients developed symptoms and in particular there was no breathlessness, chest pain, or haemoptysis. In none of the patients was there any fall in FEV₁ or VC (table II). The transfer factor fell in all patients (see the graph, where the transfer factor has been expressed as a percentage of the control value). The individual values are given in table III. On completion of the lymphogram there was a fall in five patients and in case 9 the maximum fall occurred at this time. In the remainder the greatest reduction was at 24 or 48 hours. The maximum fall in transfer factor varied from 8 to 40% (mean 22%). At 24 hours the mean reduction ($\pm$ S.E. of mean) was 3.1 ± 1.1 ml/min/mm Hg, $P < 0.05$. The reduction at 48 hours was 3.2 ± 1.4 , but this was not statistically significant.

TABLE I—Clinical Findings in Study Group before Lymphography

Case No.	Sex	Age	Diagnosis	FEV ₁ (ml)	% Predicted	VC (ml)	% Predicted	FEV ₁ /VC (%)	T _{LCO} ml/min/mmHg	% Predicted	Chest X-ray Findings
1	F.	32	Sarcoid	2,350	84	2,700	90	87	21.0	84	Hilar gland enlargement. Lungs clear
2	M.	58	Hodgkin's disease	2,850	95	3,250	81	88	26.8	104	Contraction middle lobe. Gland right hilum
3	M.	49	Lymphosarcoma	2,900	85	3,500	78	83	30.0	108	Small right pleural effusion
4	M.	62	Lymphosarcoma, chronic bronchitis	1,400	41	3,000	64	47	24.5	80	Old tuberculosis right upper lobe
5	F.	42	Hodgkin's disease	1,950	68	2,650	83	74	21.5	82	Patchy consolidation left upper lobe
6*	F.	45	Hodgkin's disease	2,000	80	2,500	96	80	19.6	85	Normal
7	M.	25	Hodgkin's disease	2,550	64	3,700	77	69	20.0	73	Old ASD. Kyphoscoliosis
8	F.	24	Lymphosarcoma	2,100	84	3,000	100	70	24.5	100	Normal
9	M.	38	Hodgkin's disease	2,800	80	3,600	82	78	20.3	70	Normal

*Previous lymphogram in 1969 with 20 ml contrast medium.

TABLE II—Mean Levels ($\pm$ S.D.) of FEV₁ and VC (in ml) before and after Lymphography

	Before	5-10 Hours	24 Hours	48 Hours	1 Week	1 Month
FEV ₁ ($\pm$ S.D.)	2,320 (504)	2,380 (446)	2,260 (607)	2,310 (471)	2,320 (560)	2,480 (280)
VC ($\pm$ S.D.)	3,130 (473)	3,260 (635)	3,100 (735)	3,230 (580)	2,930 (790)	3,350 (570)

TABLE III—Individual Values of T_{LCO} (ml/min/mmHg) and X-ray Findings in Patients Studied

Case No.	Volume of Contrast (ml)	T _{LCO}						X-ray Findings*
		Before	5-10 Hours	24 Hours	48 Hours	1 Week	1 Month	
1	12	21.0	20.6	16.8	15.6	19.0	21.0	2
2	13	26.8	23.2		19.4	24.4	22.6	0
3	12	30.0	30.0	27.8		31.5	30.7	1
4	Not recorded	24.5	25.7	21.4	22.6			1
5		21.5		20.3	15.5	16.2	22.2	1
6		14		18.3		25.9		1
7		19.6	19.3	16.2	23.7		26.0	1
8		12	20.0	28.1				1
9	14	24.5	13.6	14.7	20.1			
	15	20.3	17.5	21.0	19.4			0

*Chest x-ray findings at 24 hours graded as follows: 0 = No nodularity. 1 = Fine nodularity. 2 = Pronounced fine nodularity.

Transfer factor (T_{LCO}) after lymphography expressed as percentage of control value (mean $\pm$ S.D.).

There was no obvious relation between the fall in transfer factor and the chest x-ray appearances at 24 hours and there was not sufficient difference in the volume of contrast medium given to permit a correlation between dose and physiological change to be examined.

Discussion

In none of the patients was there any fall in FEV₁ or VC after lymphography, indicating that insufficient iodized oil fluid reached the alveoli to produce any disturbance of ventilatory function. The transfer factor, however, was reduced in all nine of the patients and the findings resemble those of Fraimow *et al.*⁵ and Gold *et al.*⁴ In the former study most measurements were made at 24 hours and no patient was examined after 48 hours, so that reversibility could not be assessed. Fraimow *et al.* found the mean time between the start of the infusion and the first observed decrease in transfer factor to be 13 hours and the mean time to the maximum decrease to be 37 hours. In their seven patients the maximum percentage fall ranged from 12 to 60%, with an approximate mean of 32%, though the actual figures were not given. They used 20 ml of

contrast for their lymphograms compared with 12 to 15 ml in the present study, and this is the probable reason for our smaller reduction (mean 22%, range 8-40%). They state that the fall in transfer factor is transient, but unfortunately details of only two subjects are given. A persistent decrease in gas transfer has, however, been recorded. In one patient the transfer factor was still reduced by 26% at 36 days.³ The subject had received 21.6 ml of iodized oil fluid and the high volume may have been relevant.

Our results have shown the reversibility of the change in transfer factor. The control value was almost attained at one week in four of the five patients who were measured and the reversal was complete at one month. It is noteworthy that the transfer factor of case 6, who had a previous lymphogram with 20 ml of contrast in 1969, was normal before the present x-ray examination.

There are two main components to the transfer factor: the membrane component, which is the diffusing capacity of the alveolar capillary membrane, and the pulmonary capillary blood volume, which is the quantity of blood in the pulmonary capillaries that is available for gas exchange. Histological studies of the lungs in man⁵ and dogs⁴ have shown that on the day of the investigation oil is widely distributed throughout the pulmonary capillary bed and a fall in gas transfer at this stage can be attributed to a reduction in the pulmonary capillary blood volume. Lung specimens obtained the next day showed the contrast to be more in the interstitial tissue and in the alveolar spaces, and the 24-hour reduction is likely to be due to an effect on the membrane component at a time when the oil appears to have been cleared from the pulmonary capillaries.

Because of the delay in recovery of the transfer factor general anaesthesia should be deferred for a week. Similarly, irradiation of the mediastinum or lungs should not be started within seven days, and lymphography must not be performed in patients who have had recent radiotherapy. The radiation causes capillary damage which allows the passage of large oil emboli into the lungs and severe symptoms, including cerebral embolism, may occur.⁶ Though no symptoms were found in these subjects severe breathlessness has been recorded by several authors.^{1,2} The patients in whom severe symptoms occurred were usually those with extensive chest disease. The fall in transfer factor is insufficient to produce complications in those with normal lungs, but where there is lung disease associated with a reduction in gas transfer, such as widespread fibrosis or severe emphysema, this investigation may be hazardous. Routine investigation is not indicated in all patients, but where there is extensive lung disease an assessment of the pulmonary function may be valuable. Because of the usual delay until the maximum reduction in transfer factor lymphography should be an inpatient procedure in such cases.

References

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Medicine in Old Age

Rehabilitation of the Elderly

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Rehabilitation of the elderly patient—that is, helping him back to as normal a life as possible (preferably in his own home environment)—is a vital part of his hospital treatment. Unfortunately, the traditional patterns of hospital care, which were evolved at a time when most patients in hospital were young, are poorly suited to the needs of the elderly and tend to create rehabilitation problems. Traditional care is centred on nursing in bed and the dangers of going to bed, brilliantly expounded by the late Richard Asher,¹ apply with particular force to the old. In addition, there are the dangerous institutionalizing effects of stay in hospital, the “good” patient being the one who most readily allows himself to be regimented and to accept the role of a passive yet grateful recipient of care. The important goals of self care are removed; clothes are replaced by dressing gown and slippers, so emphasizing the invalid role; and the patient is further conditioned to dependency by a plethora of professionals, whose authoritarian status is enhanced by such devices as hierarchies and uniforms. The end result is the patient who, when management decisions are put to him, says “you know best, doctor, I leave it all to you” and unquestioningly accepts being treated rather like a slow-witted child and allows things to be done for him that he can perfectly well do for himself. Here again the elderly are perhaps particularly vulnerable, being undervalued members of the community and survivors from a more authoritarian age.

A further problem is under-expectation. Elderly patients; their relatives, friends, and neighbours; and regrettably sometimes their general practitioners too tend to have an unduly pessimistic view of the likely outcome of the admission to hospital. Their long past experience of the hospital, not rarely a former “workhouse” with perhaps a former unenviable local reputation, is that the old came out of the hospital only one way—feet first. So we constantly hear such remarks as “what can you expect at my age, doctor?” from elderly patients. These prejudices need to be powerfully counteracted, for the benefits of hospital treatment stand up to comparison with those for younger age-groups² and most patients can be discharged home again after treatment in an active geriatric department.³

The Right Atmosphere

It is therefore vital that an atmosphere of activity and optimism exists in the geriatric wards of the hospital. The right climate,

which has such powerful effects on the expectations and progress of the individual patient, depends on many different groups: other patients, relatives, nurses, doctors, voluntary helpers, ward orderlies, porters, ministers of religion, social workers, and paramedical therapists. This very large group of individuals forms a “therapeutic community” and it is this—and not just the “rehabilitation team” of physiotherapists, occupational therapists, speech therapist, and doctors—which determines the quality of rehabilitation in the hospital ward. Good communication is needed if rehabilitation is to thrive. The ward sister, paramedical therapists, and medical staff are important group leaders, who need to create and maintain the right attitudes of enthusiasm and optimism around them; to help and direct others in the application of rehabilitation techniques; and to support and show appreciation of the value of all those forming the therapeutic community.

The establishment of an appropriate rehabilitation environment for the elderly in a ward is greatly helped by its specialized geriatric function, and this is perhaps the major justification for the separation of geriatrics from general medicine. Seeing other patients improve and go home is an undoubted encouragement to the individual patient. More active departments have an advantage here³ and progressive patient care systems are practised in most departments, long-stay patients being transferred to other accommodation to maintain greater activity in the admission and rehabilitation wards.

Nursing Staff Role

Nursing staff play a very important part. Because of their close contact with patients, relatives, and visitors it is they who can best communicate the therapeutic as opposed to custodial orientation of the department. Nursing attitudes and practice need to be adapted to the elderly. Rather than merely minister to the patient, the geriatric nurse needs to help the patient to help himself and so foster increasing independence. Firm but sympathetic re-education may be needed to modify the patient's expectations. Overprotective attitudes must be abandoned: “don't you walk on your own, you might fall” may negate all that the physiotherapist has done to build up walking skill and confidence. Nurses need to be intimately involved in the rehabilitation of the patient and so must know what stage the physiotherapist or occupational therapist has reached so as to supplement what is being done. Otherwise wily old patients often have the nurse lifting and supporting them when capable of getting up unaided and walking only with supervision by the physiotherapist, or undressing them and helping them into bed when they had dressed themselves and got in and out of bed unaided in the occupational therapy department earlier.

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