

Further Observations on the Internal Mammary Lymph Chain in Carcinoma of the Breast

By R. S. HANDLEY, O.B.E., F.R.C.S.

I am deeply sensible of the honour which the Council of this Section have done me in asking me to speak this evening for we pay homage, not only to a great American surgeon, but to one who has left a permanent mark on world surgery. I suspect that I have been asked to speak for two reasons. The first is my name, which, thanks to my father's work, is one which is sometimes coupled with Halsted's in discussions on the treatment of breast carcinoma. And the second is that, in collaboration with my colleague in pathology, Dr. A. C. Thackray, I have been able to follow up a thought of Halsted's, a thought which he himself did not pursue. Here it is:

"Dr. H. W. Cushing, my house surgeon, has in three instances cleared out the anterior mediastinum on one side for recurrent cancer. It is very likely, I think, that we shall, in the near future, remove the mediastinal contents at some of our primary operations."

(W. S. Halsted. *Annals of Surgery*, 1898.)

I must confess that Dr. Thackray and I drew our inspiration, not direct from Halsted, but from a clinical paper by my father in 1927, in which he argued that the internal mammary lymphatic chain was invaded in carcinoma of the breast much more often than was thought. It seemed to us that the ideas he formulated ought to be tested by the microscope on a quantitative basis, and we therefore started to do biopsies on the internal mammary chain at the end of 1946.

[The speaker then showed slides to illustrate the anatomy of the internal mammary chain and his method of biopsy.]

I have now done biopsies of the internal mammary lymphatic nodes in 119 cases of breast carcinoma. The procedure has been done, not as a part of therapy, but as a pathological reconnaissance. The second space has most often been explored, but latterly we have usually looked into two or more spaces.

The results of this extremely simple manoeuvre are as follows:

TABLE I.—INVASION OF INTERNAL MAMMARY LYMPH NODES. ANALYSIS OF 119 CASES

	Total number of cases	Site of primary growth of breast		Total
		Inner half	Outer half	
		45 (38%)	74 (62%)	119
All nodes free	10	10 (9%)	28 (24%)	38 (33%)
Axillary nodes only invaded	8	8 (7%)	32 (27%)	40 (34%)
Internal mammary nodes only invaded	3	3 (3%)	1 (1%)	4 (3%)
Both axillary and internal mammary nodes invaded	24	24 (20%)	13 (10%)	37 (31%)

Table I shows that 34% of these growths had metastasized to the internal mammary chain, and where a radical mastectomy was done, it had failed as a curative operation before it started. If we consider the 45 growths in the inner half of the breast, 27 (or 60% of them) had metastasized to the internal mammary chain, whereas of the 74 tumours in the outer half of the breast only 14 (or 19% of the 74) had so metastasized.

Table II shows my first hundred cases analysed by quadrants.

TABLE II.—100 CARCINOMAS OF BREAST

	Total	Site of Primary Growth in Breast by Quadrants					Total
		Upper		Central	Lower		
		inner	outer		inner	outer	
	20	7	12	50	11	100	
All nodes free	8	2	0	19	4	33	
Axillary nodes only invaded	3	1	3	21	6	34	
Internal mammary nodes only invaded	1	0	2	1	0	4	
Both internal mammary and axillary nodes invaded	8	4	7	9	1	29	

The middle column shows that those growths situated behind the nipple included with inner half tumours in Table I had all metastasized to lymph nodes, 9 of them involving the internal mammary chain.

Nobody yet knows what is the importance of the internal mammary chain. Deposits in the internal mammary chain are often extremely small and it has been maintained that they are too small to matter much. This argument reminds me of the famous excuse given by the young lady who had a baby when she ought not to have done—that it was only a very little one. Some have thought that the tissues of the anterior mediastinum had special powers of resisting the spread of carcinoma. I have

found no evidence to support this view. Yet others have thought that my cases showed an unusually large number of inner-quadrant primary growth, but in fact the quadrant distribution of my first 100 cases corresponds closely to Truscott's very large series. A further objection has been that clinical recurrence is seldom seen at the antero-medial ends of the intercostal spaces. But the nodes of the internal mammary chain expand, when invaded, in the line of least resistance, i.e. towards the lung.

The only light at present available on the importance of mammary chain deposits is from the fate of the first 50 cases of internal mammary chain biopsy which have now been done three years. That light, owing to the smallness of the numbers and the shortness of the time since treatment, is dim, but here it is (Table III):

TABLE III.—SURVIVAL OF 50 CASES OF CARCINOMA OF BREAST AT 33 MONTHS

	Alive	Dead	Total
All glands free	15	1	16
Axillary glands only invaded	10	6	16
Internal mammary glands only invaded	2	0	2
Internal mammary and axillary glands invaded ..	5	11	16

These numbers are too small and the time is too short for conclusions, but it is interesting that twice as many patients, whose axillary glands only are invaded, are alive as those in whom both axillary and internal mammary glands are invaded. I wish, however, to point out especially that both the patients in whom only the internal mammary nodes were invaded, are alive and well.

Internal mammary biopsy, in my view, makes nonsense of systems of pathological staging. I think it fair to maintain that, once carcinoma cells have gained a foothold inside the bony cage of the chest a case must be assigned to Stage III. On that basis the effects of my biopsy procedure on the staging of the first 100 cases is as follows (Table IV):

TABLE IV

	Clinically	Pathologically	
		Ignoring int. mammary findings	In light of int. mammary findings
Stage I	51	36	32
Stage II	43	58	34
Stage III	6	6	34

The usual inaccuracy in clinical staging is apparent. The difference which the mammary biopsy makes is most striking as between Stage II and Stage III.

A discussion on the practical implications on treatment in the light of these findings would be tentative and controversial. Instead I shall turn to the realm of speculation. The axillary lymphatic pathways are the main drainage channel of the breast. They are, however, provided with an effective filtering mechanism, consisting of scores of lymph nodes. This filter does not adjoin any vital viscera and we can reach it easily by radical mastectomy. We can, in fact, clear it out so effectively that recurrence is unusual in the axilla after radical mastectomy. If the filter is heavily contaminated or has been short-circuited by channels reaching its upper end directly, we are, of course, too late to deal with it effectively, but in early cases we should be able to prevent spread through it. The case is far otherwise with the internal mammary chain. It lies on the pleura and is a main lymphatic road from the liver and diaphragm. It is very difficult to reach surgically, yet it is often invaded before the axilla is heavily implicated. Not only do I think that spread of carcinoma to the internal mammary chain accounts for those puzzling recurrences which occur when a radical mastectomy has been done on an early case, but I also believe that it accounts for the fact that metastasis is commonest in the lungs and pleura and that, in post-mortem series, the liver is the second most commonly invaded organ. I think in fact, that in breast carcinoma, the internal mammary chain is the principal highway of death.

The axillary and internal mammary lymphatic pathways may not be the only routes open to carcinoma cells of escape from the breast. Where there are blood vessels it is justifiable to postulate the existence of lymphatics. The breast receives some blood from the lateral perforating arteries and there may be lymphatic paths here for spread to the intercostal spaces. I have on several occasions removed sections of the lateral perforating neurovascular bundles but so far Dr. Thackray has failed to find carcinoma cells in them.

I must thank you for listening to me with such patience and remind you that our main purpose this evening is, to "praise famous men and our fathers that begat us".