Critical Appraisal of Lymphangiography in Cancer of the Female Genital Tract

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The first publication on direct lymphography was made by *J. B. Kinmonth* (1) in 1952.

The use of lymphography in gynecological cancer was first described by *J. M. Colette* (2) in 1958.

Whether this method is useful in the diagnosis and in the treatment of cancer of the female genital tract is still 12 years later a source of debate.

Although many reports have been very enthusiastic about this technic in the management of cancer of the genital tract, many others have been rather pessimistic.

It is only by a good historadiological correlation of a very large number of cases that the problem can be solved.

The following article will provide an additional experience on that field and try to definite more precisely the limits of lymphography in gynecological cancer.

Material and Method

From november 1965 to january 1970, in the department of gynecology at the "hopital St. Pierre in Louvain", 105 lymphographies had been performed in gynecological cancers (mostly of cervical origin). In five other cases lymphography was attempted but because of a negative (3) patent blue V test at the dorsum of the feet no lymphatics could be visualized.

The method of injection has been thoroughly described in numerous publications (1, 2, 4, 5, 6). The contrast material used was Lipiodol U.F. with or without chlorophyll. 10 to 12 cc were injected on each side in approximately 2 hours.

At the completion of the injection and 24 to 48 hours later, anteroposterior, right and left oblique and lateral films of the pelvis and of the abdomen were taken together with a chest X-ray. However in order to obtain more details of the nodal architecture or to separate groups of overlapping nodes, one may proceed to complementary films: later follow up, other angle incidences, laminographies.

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On 17 patients lymphography was repeated twice: the first examination was done for diagnostic purposes with plain Lipiodol U.F., before any treatment was started; the second one was performed with chlorophyllized Lipiodol U.F., 5 weeks later, 2 to 3 days preoperatively in order to facilitate the excision of the lymph nodes at the time of the lymphadenectomy.

Table 1 105 Lymphographies.

Type of cancer	negative	positive	uninterpretable	total
Cervix uteri				
Stage I	15	5	7	27
Stage II	12	18	8	38
Stage III	1	2	–	3
Stage IV	1	1	–	2
Recurrence	1	3	–	4
Corpus uteri	8	3	1	12
Vulva	2	5	1	8
Vagina	–	4	–	4
Ovaries	4	3	–	7
Total	44	44	17	105

Table 1 shows the case distribution of 105 lymphographies. In 40 cases a correlation between the histological and the radiological findings was made. This was in the cases where a surgical treatment of the disease was performed and where a preoperative lymphography had been done. In all cases the lymphadenectomy was complete. Each node was nominated following its anatomical position. All nodes were submitted for histological examination.

The technique of correlation used has been thoroughly described by *Declève* and *Maldague* in 1966 (7). Every lymph node after fixation in Bouin fixator is cut in 1 mm thick slices; each one of the slices is radiographed on a thin grain emulsion film. The slices are included in paraffin and 5 microns thick serial sections are cut and stained with hemalun – eosine – safran and examined under the microscope.

Complications

Complications have been very rare in this series.

There has been no death and apparently no irreversible morbidity.

The most severe complication was a circulatory collapse that responded rapidly to medication.

Any patient whose clinical history or cardiorespiratory tests would suggest a cardiorespiratory disease, would not be submitted to a lymphographic examination. Diabetes is also a contra-indication.

Normal Lymphograms

The radiological aspect of the normal lymphatic pathways of the pelvis, has been thoroughly described in many publications (6, 7, 8). Nodes of the obturator fossa (medial group of the external iliac chain) are always opacified.

Internal iliac nodes are filled in 35% of the cases. The opacification of these nodes occurs either by retrograde injection from-the common iliac chain, which would suggest some kind of proximal obstruction, or by a direct filling from the "obturator chain" into the internal iliac nodes. This has been confirmed by direct injection of patent blue V into an "obturator node" during an operation and by radiological sequences of the filling of the pelvic nodes during a lymphangiographic injection.

Radiological Criteria of Metastatic Invasion

The radiological diagnosis of metastasis was based on various criteria that have been classified in two main groups: direct and indirect.

Direct signs, wich are better observed on 24 to 48 hours films, are marginal filling defect of a node (Fig. 5 a), absence of a node or absence of a lymphatic group that is totally replaced by tumor. However, as it has been described by various authors (7, 11, 12) several benign conditions (fatty degeneration-fibrosis-periadenitis) may simulate a malignant process (Fig. 1). There may also be a congenital absence of a group of nodes.

Indirect signs are more reliable but much less frequent than direct signs. One detects them on the immediate post injection films (Fig. 2). They include collateral circulation, displacement of lymphatic channels, blockage of the lymphatic flow and extravasation.

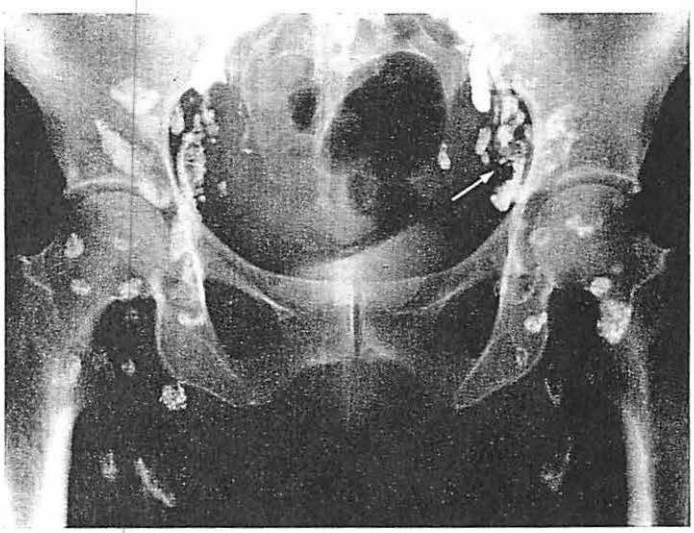


Fig. 1 Lymphography – anteroposterior radiograph of pelvis 24 hrs after injection of Lipiodol. Marginal filling defect of external iliac node. Histological examination revealed fatty degeneration.

In case of a prolonged stasis, late films, taken more than 24hrs after the injection, may show the opaque material still filling the lymphatic vessels. In this series, such indirect signs have been observed in only 30% of the cases where the pathological diagnosis of metastatic involvement of the nodes was made.

Fig. 2 Cancer of the ovary. Lymphography – anteroposterior radiograph of pelvis and abdomen immediately after injection of Lipiodol. Obstruction, deviation and suspicion of filling defects (arrow) in the external iliac nodes and absence of the common iliac chain.

Results

Lymphographies were performed 105 times in gynecological cancers.

In 17 cases where chlorophyllized Lipiodol was used, the interpretation was unsatisfactory (Fig. 3 a and b).

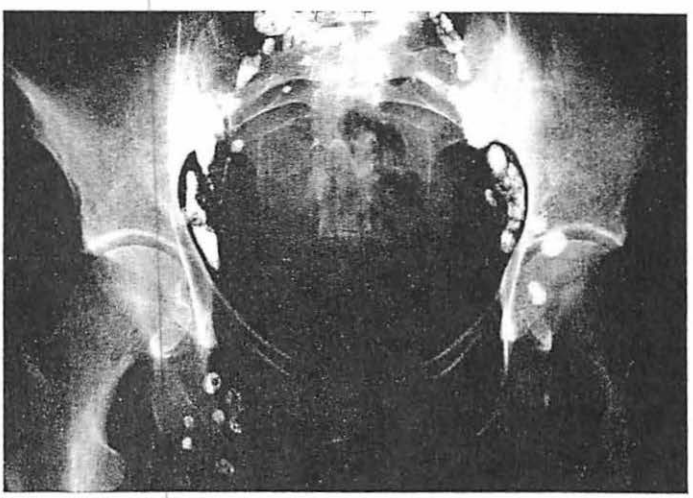


Fig. 3 a Lymphography with Lipiodol UF – anteroposterior radiograph of pelvis 36 hrs after injection shows almost total evacuation of the lymphatic channels.

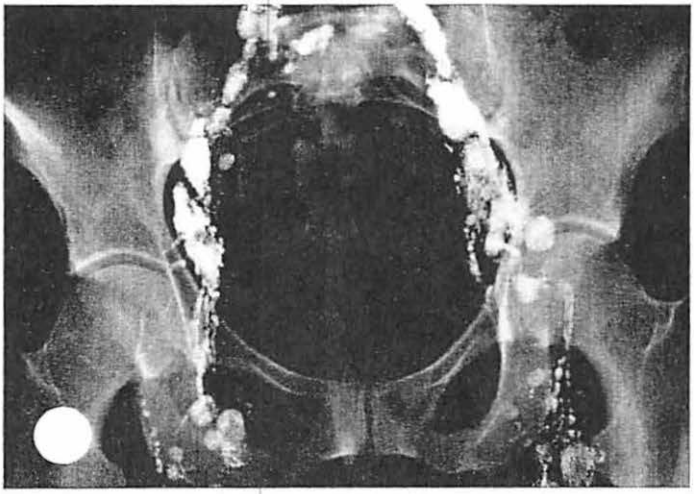


Fig. 3 b Chromolymphography with Lipiodol UF and chlorophyll taken by same patient. Anteroposterior radiograph of pelvis 36 hrs after injection shows extravasation and very poor evacuation of the lymphatic vessels.

The radiological interpretation could be correlated to the histological findings in 40 cases where a surgical treatment was performed (Table 2).

In 14 cancers of the cervix stage I, lymphography was considered negative in 11 cases and positive in 3 cases; the histological examination confirmed the negative findings in 10 cases and the positive findings in 2 cases; there was one false positive and one false negative result.

In 17 cancers of the cervix stage II, 4 lymphographic examinations were read as negative and 13 as positive; the histological correlation was exact three times in negative findings and five times in positive findings. The correlation was thus very poor since there was 1 false negative result and 8 false positive results.

There was 1 cancer of the cervix stage IV, where a pelvic exenteration with lymphadenectomy was performed; in that case the correlation was exact.

Table 2 Historadiological correlation (40 cases).

Type of cancer	Lymphography		Histology		False	False	Total
	–	+	–	+	–	+	
Cervix uteri							
Stage I	11	3	10	2	1	1	14
Stage II	4	13	3	5	1	8	17
Stage IV	–	1	–	1	–	–	1
Corpus uteri	2	1	3	–	–	1	3
Vulva	1	3	1	3	–	–	4
Vagina	–	1	1	–	–	1	1
Total	18	22	27	13	2	11	40

In 3 adenocarcinomas of the endometrium the histological examination of the nodes was always negative; the lymphangiography was misleading in one case where it was considered as positive.

In 4 epitheliomas of the vulva, the concordance was always exact with 1 negative finding and 3 positive findings.

In 1 epithelioma of the vagina there was one false positive result.

In 40 cases of gynecological cancer where a correlation between radiological and pathological findings was performed, there were 11 false positive results and 2 false negative results. The percentage of errors in this series was thus very high (32%).

Thanks to lymphography the number of lymph nodes excised has increased. Before the use of lymphography 10 to 15 lymph nodes were hardly obtained. With preoperative lymphography this number increased to 25 to 40.

Discussion

In the present series of 40 historadiological correlations, the percentage of errors was very high. False positive cases were particularly frequent.

In reviewing all the X-rays where the errors were made, the same conclusions were drawn in the 2 false negative cases and in 6 out of the 11 false positive cases.

In 4 cases the diagnosis of nodal involvement was made on marginal filling defects of Cloquet's nodes; these nodes are quite often poorly filled with Lipiodol. Isolated marginal filling defects of these nodes should never allow a diagnosis of metastasis.

In 1 case the lymphography was considered suspicious because of a postero lateral collateral circulation. Such an isolated indirect sign is not sufficient to be taken into consideration.

Direct signs of metastasis are quite often unreliable because benign alterations of the lymph nodes like fatty degeneration, fibrosis, periadenitis, may give similar radiological pictures.

Indirect signs are more reliable but unfortunately, less common. They appear mostly in extensive neoplastic diseases and very seldom in early stages.

In 17 cases where chlorophyllized Lipiodol was used, the interpretation was unsatisfactory (Fig. 3 a and b). Chlorophyllized Lipiodol stays longer in the lymphatic channels and gives very poor details of the architecture of the lymph nodes. It should never be used for diagnostic purpose.

Preoperative lymphography contributes effectively to a more complete excision of pelvic lymph nodes. The slight inflammatory reaction secondary to the injection of Lipiodol and the filling of the nodes by the opaque material increase the volume of the nodes and facilitate their complete excision; chromolymphography with chlorophyll helps sometimes to visualize the lymphatic chains but is not mandatory. The completeness of the lymphadenectomy can be controlled by a portable X-ray on the operating table before closure of the abdomen (Fig. 4 a and b).

Lymphography is indicated in many other conditions: lymphoceles are easily demonstrated (13); radiotherapy can be better orientated on suspicious areas; the effectiveness of radiation therapy can be very well evaluated by comparing X-rays taken before and after treatment (Fig. 5 a and b).

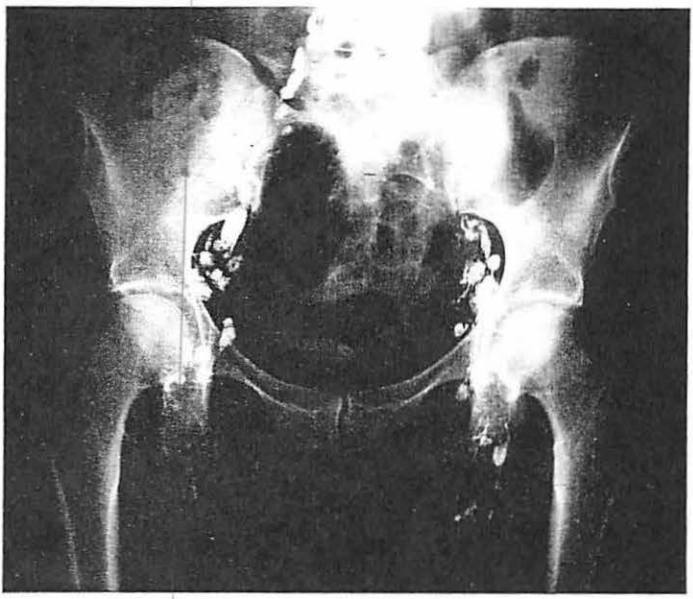


Fig. 4 a Lymphography antero posterior film of the pelvis 24 hrs after injection of Lipiodol.

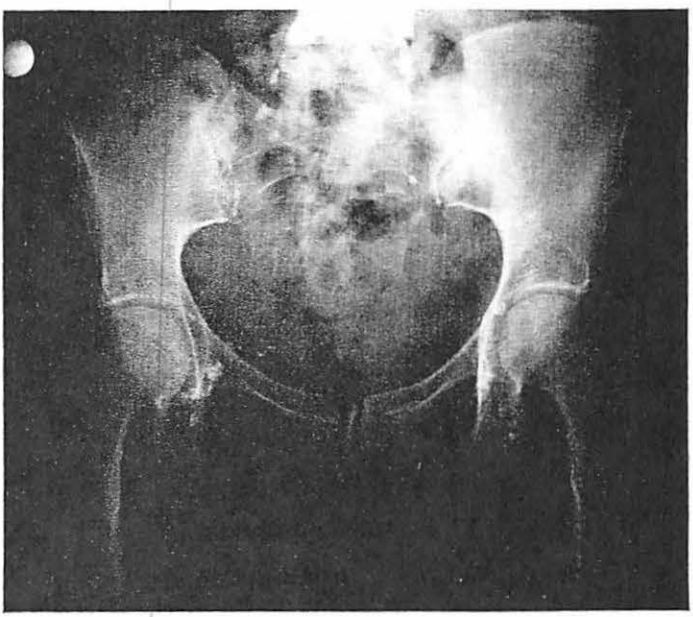
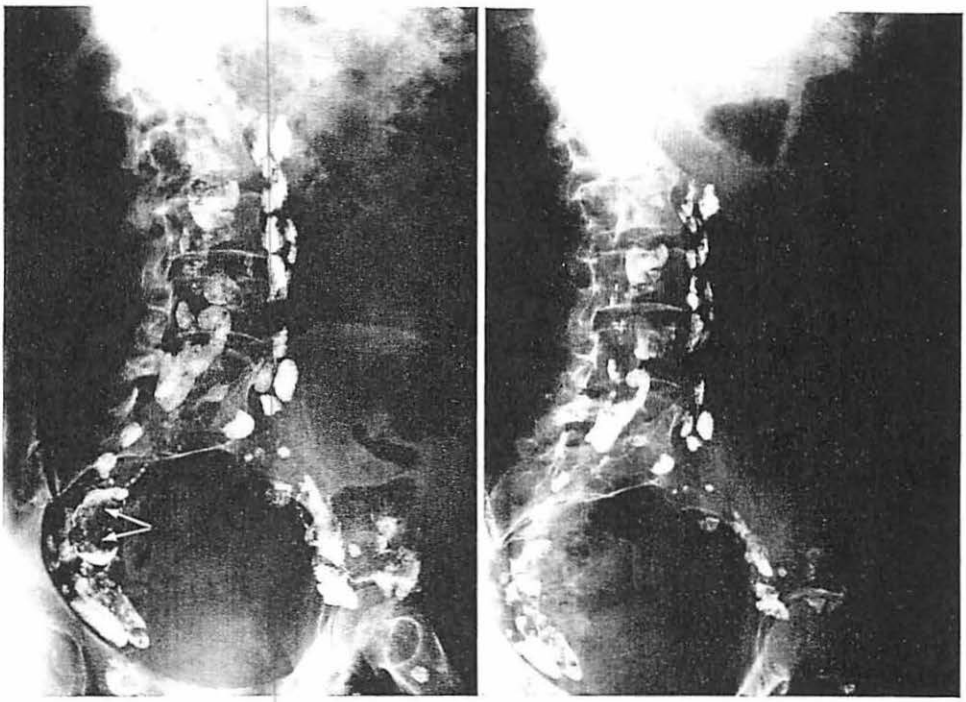


Fig. 4 b Same patient – Film taken on the operating table before closure of the abdomen. All deep pelvic nodes have been removed.



a b

Fig. 5 a Cancer of the cervix. Lymphography – Left oblique film of pelvis and abdomen taken before radiation therapy.

Fig. 5 b Same position – Radiograph taken after radiation therapy shows marked decrease in size of all pelvic and abdominal nodes.

Conclusions

1. Lymphography is rather a disappointing technique in the diagnosis of early metastasis of the lymph nodes in gynecological oncology; in this series the percentage of errors is 32%. Lymphography should be considered mostly as an orientation technique in the diagnosis of metastatic involvement of the lymphatic system in cancer of the genital tract.
2. False positive results are more common because many benign conditions may simulate radiologically a malignant process.
3. The use of chlorophyllized Lipiodol makes the interpretation of the lymphogram very difficult.
4. Preoperative lymphography is a must in helping to perform a more complete lymphadenectomy.
5. Lymphography is also helpful in other conditions: diagnosis of lymphoceles and radiotherapeutic treatment.

Summary

A series of 105 pelvic lymphographies in gynecological cancer has been reviewed. Details in the technique of lymphography and in the interpretation of normal and pathologic lymphograms have been noticed.

Complications were very rare and without apparent irreversible morbidity.

A correlation between the radiological interpretation and the histological findings of serial section of the nodes has been made in 40-cases where a surgical treatment was performed.

The usefullness of lymphography in the performance of lymphadenectomy and in other conditions like lymphoceles and radiotherapeutic treatment has been discussed.

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References

1 *Kinmonth, J. B.:* Lymphangiography in man. Clin. Sci. 11 (1952), 13-20

2 *Colette, J. M.:* Envahissements ganglionnaires inguino-iliopelviens par lymphographie. Acta radiol. (Stockh.) 49 (1958), 154-165

3 *Gruwez, J. A.:* La lymphographie. Acta chir. belg. Suppl. 2 (1968), 167-195

4 *Del Buono, M. S., W. A. Fuchs, A. Rüttimann:* La linfografia technica, indicazione, diagnostica. Radiologia (Roma) 15 (1959), 1045-1080

5 *Averette, H. E., R. C. Hudson, M. I. Viamonte* jr., *R. E. Parks, J. H. Ferguson:* Lymphangiadenography (lymphography) in the study of female genital cancer. Cancer 15 (1962), 769-775

6 *Averette, H. E., W. J. Le Maire, C. J. Lecart, J. H. Ferguson:* Lymphography in the pre operative detection of lymphatic metastasis. Obstet. and Gynec. 27 (1966), 122-129

7 *Declève, A., P. Maldague:* Technique de confrontation radioanatomo-histologique dans l'interprétation de la lymphographie. J. belge Radiol. 49 (1966), 301-314

8 *Arvay, N., J. D. Picard:* La lymphographie (étude radiologique et clinique des voies lymphatiques normales et pathologiques). Masson, Paris 1963

9 *Abitol, M. M., C. H. Meng, S. L. Romney:* Anatomic and therapeutic aids of lymphangiography in pelvic malignancy. Amer. J. Obstet. Gynec. 93 (1965), 95-101

10 *Jackson, R. J. A.:* Lymphographic studies related to the problem of genital tract. J. Obstet. Gynaec. Brit. Cwlth 74 (1967), 339-352

11 *Ditchek, T., R. Blahut, A. Kittleson:* Lymphography in normal subjects. Radiology 80 (1963), 175-181

12 *Collard, M., M. Fievez, S. Godart:* Etude microradiographique et anatomique des images adénographiques lacunaires non néoplasiques. J. belge Radiol. 50 (1967), 251-257

13 *Ferguson, J. H., J. C. Maclure:* Lymphocele following Lymphadenectomy. Amer. J. Obstet. Gynec. 82 (1961), 783-792

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