found that by 2 weeks of age the proportion of fully breast-fed babies had fallen to ±54%. During the first few weeks after delivery many mothers introduce artificial feeding. The technique of artificial feeding reportedly employed by mothers were highly satisfactory.

CONCLUSION

The trend towards delivery of as many mothers as possible in MOUs is desirable in that it has been accompanied by falling perinatal mortality rates. This study has shown that the accompanying rising rates of early discharge of selected patients from these units has not lead to additional problems for mothers and babies in the early days after returning home.

The Medical Superintendents and nursing staff of the hospitals and MOUs in the Peninsula Maternity Services are thanked for their co-operation.

REFERENCES

1. Van Coeverden de Groot, H. A., Davey, D. A., Smith, J. A. *et al.* (1978): S. Afr. med. J., **53**, 706.
2. Reilly, N. (1976): *Working Paper 6 - 76* (Technical Management Services). Cape Town: City Engineer's Department, Cape Town City Council.
3. Theobald, G. W. (1959): Brit. med. J., **2**, 1364.
4. *Idem* (1962): Lancet, **1**, 735.
5. Russell, J. K. and Miller, M. R. *in* McLachlan, G. and Shegog, R., eds (1970): *In the Beginning*. London: Oxford University Press.
6. Drummond, G. (1977): Nursing Times, **73**, 734.
7. Donaldson, N. E. (1977): Amer. J. Nursing, **77**, 1176.
8. Yanover, M. J., Jones, D. and Miller, M. D. (1977): New Engl. J. Med., **294**, 702.
9. Cape Town City Council (1978): *Report of the Medical Officer of Health*. Cape Town: Cape Town City Council.
10. Power, D. J., Willoughby, W. and De Waal, R. H. (1979): S. Afr. med. J., **55**, 718.

Routine Investigations in the Clinical Staging of Invasive Carcinoma of the Cervix

A Critical Evaluation

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SUMMARY

From July 1976 to December 1978 invasive carcinoma of the cervix in 369 new patients at Tygerberg Hospital, Parowvallei, CP, was classified into stages according to the International Federation of Gynaecology and Obstetrics (FIGO) classification. Most of these patients underwent routine intravenous pyelography, cystoscopy, and skeletal and chest radiography, the results of which were analysed in relation to the stage of the disease to decide whether all these investigations are needed in every case. It is concluded that under certain circumstances cystoscopy and skeletal radiography may be omitted with safety in stage I and stage II disease.

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The need for accurate clinical staging in all new patients with invasive cervical carcinoma is beyond doubt.[1-5] For this reason the International Federation of Gynaecology and Obstetrics (FIGO) suggested during 1971 that uniform clinical staging of cervical carcinoma be instituted.[6] This enables comparison of different treatment regimens and more accurate prognostication. Various special investigations form an integral part of the clinical staging, and undoubtedly some of these tests are absolutely essential. There is, however, some doubt about the need for some of the routine special investigations.

With this in mind, we decided to evaluate these investigations critically in our unit. The analysis included all new patients with invasive carcinoma of the cervix ad-

mitted to the Department of Gynaecological Oncology at Tygerberg Hospital, Parowvallei, CP, over a period of 30 months. Our aim was to establish how the clinical staging in these patients corresponded to the findings on intravenous pyelography, cystoscopy, and skeletal and chest radiography.

PATIENTS AND METHODS

During the period July 1976 - December 1978 a total of 369 new patients with invasive carcinoma of the cervix was evaluated and the disease classified into stages in the Department of Obstetrics and Gynaecology, Tygerberg Hospital. The clinical staging was done by the Head of the Department of Gynaecological Oncology in conjunction with the Head of the Department of Radiotherapy. At this combined clinic, conducted once a week, we wish to have all the special investigations available in order to make a final decision about clinical staging and to plan future therapy. Examination under anaesthesia is resorted to only under special circumstances.

All new patients were subjected to the following special investigations as a routine: (*i*) full blood count and erythrocyte sedimentation rate; (*ii*) serum urea and electrolyte estimations; (*iii*) liver function tests and enzyme estimations; (*iv*) midstream urine examination (microscopy, culture and sensitivity tests); (*v*) cervical cytological examination; (*vi*) histological confirmation of invasive carcinoma by punch biopsy or cone biopsy, when necessary; (*vii*) cytological examination of midstream urine; (*viii*) chest radiography; (*ix*) skeletal radiography; (*x*) intravenous pyelography; (*xi*) cystoscopy; and (*xii*) bone, brain or liver scan, when specifically indicated.

There is no doubt that the first 6 special investigations are essential in the management of all patients with invasive carcinoma of the cervix and that radio-isotope scanning should be reserved for special circumstances. The need for routine chest radiography, skeletal radiography, intravenous pyelography and cystoscopy under the circumstances prevailing at this institution was examined.

Intravenous pyelography was performed in 357 patients (96,7%), while 356 patients (96,4%) underwent cystoscopy and 339 (91,8%) skeletal and chest radiography (Table I). Intravenous pyelography was performed by the intravenous administration of 50 ml of 50% sodium iothalamate (Conray 420, Maybaker (SA) Pty Ltd). Before the administration of the dye a straight radiograph of the abdomen was taken. Immediately after the injection a film was taken, followed by one film every 5 minutes for 15 minutes. In hypertensive patients an additional film was taken 3 minutes after injection of the dye. In patients with signs of ureteric obstruction or with poor or absent excretion of the dye, additional films were taken 0,5, 1, 2, 4 and 8 hours after injection, depending on each specific case.

Cystoscopy was performed under local anaesthesia as a routine, general anaesthesia being resorted to only when difficulty arose. Whenever there was a possibility of malignant infiltration of the bladder mucosa a cystoscopically directed biopsy was done.

TABLE I. ANALYSIS OF CLINICAL STAGING IN 369 NEW PATIENTS, JULY 1976 - DECEMBER 1978

Clinical staging	Total	Availability of special investigations: Intravenous pyelography	Cystoscopy	Skeletal and lung radiography
Ia	17	7	7	5
Ib	72	72	71	65
IIa	17	17	17	16
IIb	93	93	93	88
IIIa	4	4	4	4
IIIb	128	128	128	124
IV	38	36	36	37
Total	369	357 (96,7%)	356 (96,4%)	339 (91,8%)

Skeletal radiographs included the spinal column, skull, pelvis and long bones. Whenever there was any suggestion of bony metastases, confirmation by bone scan was requested. Routine posterior-anterior chest radiography was done in all cases. Lateral chest films and tomograms were taken only to confirm possible lung metastases.

RESULTS

An analysis of the clinical staging in the 369 patients in this series and the availability of the four special investigations being analysed in the different stages of invasive cervical carcinoma are presented in Table I. It is unfortunate that in such a high percentage of patients with stage Ib - IV disease skeletal and chest radiographs were not taken, but owing to the heavy workload in the Department of Radiodiagnosis there is sometimes a delay before the investigation can be done, with the result that clinical staging is sometimes done before all investigations have been completed. Soon after the staging and planning, the patient is transferred to another hospital for radiation therapy, and unfortunately in some patients in this series the investigations were never done.

Intravenous Pyelography

The intravenous pyelogram (IVP) was normal in 270 of our patients (75,6%) (Table II). In none of the cases clinically classified as stage I was there an abnormal IVP. However, in stage IIa 5,9% and in stage IIb 5,4% of cases had an abnormal IVP. This was also the case in 42,2% of stage IIIb and 75,0% of stage IV patients. Bilateral ureteric obstruction with hydronephrosis was present in 2 patients with stage IIb disease, in 15 patients with stage IIIb disease, and in 12 patients with stage IV disease. Unilateral hydronephrosis with a non-functioning kidney on the opposite side was present in 22 patients. The results of intravenous pyelography were therefore solely responsible for reclassifying 6 cases of stage II disease to stage IIIb disease (Table II).

TABLE II. ANALYSIS OF INTRAVENOUS PYELOGRAMS IN 357 PATIENTS

Clinical staging	Total	Obstruction with hydronephrosis: Left ureter	Obstruction with hydronephrosis: Right ureter	Obstruction with hydronephrosis: Bilateral	Total obstruction: Left ureter	Total obstruction: Right ureter	Normal IVP
Ia	7	0	0	0	0	0	7 (100%)
Ib	72	0	0	0	0	0	72 (100%)
IIa	17	0	1	0	0	0	16 (94,1%)
IIb	93	1	2	2	0	0	88 (94,6%)
IIIa	4	0	0	0	0	0	4 (100%)
IIIb	128	16	9	15	5	10	74 (57,8%)
IV	36	9	4	12	3	4	9 (25%)
Total	357	26	16	29	8	14	270 (75,6%)

IVP = intravenous pyelogram.

TABLE III. COINCIDENTAL FINDINGS ON INTRAVENOUS PYELOGRAPHY IN 357 PATIENTS

Clinical staging	Total	Chronic pyelonephritis	Renal calculi	Renal cyst	Double ureter
Ia	7	0	0	0	0
Ib	72	0	0	0	3
IIa	17	0	0	0	0
IIb	93	1	1	1	1
IIIa	4	0	0	1	0
IIIb	128	5	0	0	2
IV	36	0	0	0	0
Total	357	6	1	2	6

TABLE IV. ANATOMICAL SITE OF URETERIC OBSTRUCTION

Anatomical site	Number of patients
Ureterovesical junction	28
Distal third of ureter	36
Middle third of ureter	3
Unknown (no excretion)	22

Other abnormalities incidentally discovered on pyelography are listed in Table III. Double ureter was present in 1,7% of patients, kidney cysts were present in 0,6% and renal calculi in 0,3%. The exact location of the ureteric obstruction could be ascertained in 67 cases; in 64 (95,5%) the obstruction was either in the distal one-third of the ureter or at the junction of the ureter and the bladder (Table IV). In 22 cases (6,2%) no excretion was present on pyelography and it was therefore not possible to locate the site of obstruction.

Cystoscopy

The cystoscopic examinations were negative in 272 (76,4%) of the 356 patients examined (Table V). Biopsies were performed in 72 patients (20,2%), of whom 39 (10,9%) had a malignant infiltration from a primary cervical lesion. In a further 33 patients (9,3%), bullous oedema of the bladder wall was present without infiltration of the bladder mucosa. None of the patients clinically classified as having stage I or stage II disease had any bladder involvement (statistically significant; $P<0,01$). Bladder infiltration was, however, present in 10,9% of patients originally classified as having stage IIIb disease; these cases were reclassified to stage IV. Bladder infiltration was present in 66,7% of the stage IV cases on cystoscopy, and another 16,7% of patients presented with a malignant vesicovaginal fistula. Only 6 of our stage IV patients had no bladder involvement. Of these, 2 presented with lymph node involvement outside the true pelvis, 2 presented with lung metastases and 2 had bony metastases. Two stage IV patients did not undergo cystoscopy because they were in a terminal state on admission; both patients died within 1 week after admission. One had brain metastases (proved on brain scan) and the other widespread lung and bony metastases.

Radiographs

Of the 339 patients, 331 (97,6%) had normal skeletal radiographs (Table VI). No bony metastases were discovered in stage I or stage II cases (statistically significant; $P<0,02$). Only 1 patient originally classified as having stage IIIb disease, had to be reclassified as having stage IV disease after bony metastases had been discovered. Seven of the stage IV patients presented with bony metastases. Lung metastases were present in only 3 (0,9%) of the 339 patients examined (Table VI). They were all originally classified as having stage IV disease.

DISCUSSION

Renal failure secondary to ureteric obstruction still remains the major cause of death in cases of cervical carcinoma.[7]

TABLE V. CYSTOSCOPIC FINDINGS IN 356 PATIENTS

Clinical staging	Total	Malignant infiltration	Bullous oedema	Distortion of bladder by tumour	Bladder fistula	Negative
Ia	7	0	0	0	0	7
Ib	71	0	0	0	0	71
IIa	17	0	0	0	0	17
IIb	93	0	3	2	0	88 (94,6%)
IIIa	4	1	1	0	0	2
IIIb	128	14 (10,9%)	26 (20,3%)	8	0	81 (63,2%)
IV	36	24	3	0	6	6
Total	356	39	33	10	6	272 (76,4%)

TABLE VI. RESULTS OF SKELETAL RADIOGRAPHS IN 339 PATIENTS

Clinical staging	Total	Normal	Metastases: Spinal column	Metastases: Lung
Ia	5	5	0	0
Ib	65	65	0	0
IIa	16	16	0	0
IIb	88	88	0	0
IIIa	4	4	0	0
IIIb	124	123 (99,2%)	1 (0,8%)	0
IV	37	30 (81%)	4	3
Total	339	331	5	3

The FIGO classification therefore stresses the importance of changing the original clinical staging to IIIb once ureteric involvement becomes apparent.[6] This was confirmed in 6 of our patients in whom the original clinical examination suggested stage II disease, but the finding of ureteric involvement necessitated restaging to IIIb. These findings correspond to recent reports in the literature.[2,5]

Cystoscopic examination is essential to exclude involvement of the bladder mucosa but is not completely free from complications, and 15 - 20% of patients may have bladder infection afterwards.[5] In our study none of the 188 patients classified as having stage I or stage II disease had any bladder involvement on cystoscopy ($P<0,01$). These findings also correspond to those in the literature.[2,5]

Bony metastases were present in 8 of our patients; of these 7 were already classified as having stage IV disease because of other positive findings. In only 1 case were the bony metastases discovered on skeletal radiography responsible for changing the original staging. The series of Griffen *et al.*,[2] with only 2 out of 227 (0,9%) positive lung metastases on chest radiography, corresponds very closely to our incidence of 3 out of 339 (0,9%).

In an institution such as Tygerberg Hospital the various departments responsible for the special investigations considered essential in invasive carcinoma of the cervix often have to cope with a very heavy workload. For this reason the need for the various investigations should be reconsidered at regular intervals. By reducing unnecessary investigations to a minimum, service from these departments will be more prompt and a reduction in cost of medical services will follow automatically.

In analysing our results we have no doubt that intravenous pyelography is absolutely necessary in all clinical stages of invasive carcinoma of the cervix. Although lung metastases had been discovered by chest radiography in only 0,9% of our patients, we feel that this investigation remains essential not only for excluding metastases but for other obvious reasons.

Routine cystoscopy has certain dangers. None of our patients with a clinical diagnosis of stage I or stage II disease had any secondary malignant involvement of the bladder. Bony metastases discovered on skeletal radiographs were responsible for reclassification in only 1 of our cases. It therefore seems reasonable to conclude that in a referral centre where senior personnel assess the clinical staging in all cases of invasive cervical carcinoma, it is safe to exclude routine cystoscopy and skeletal radiography in stage I and stage II disease.

Regular critical evaluation of the various diagnostic aids and comparison of the treatment and prognosis of our patients under different circumstances will enable us to improve the chance of permanent cure for patients with invasive carcinoma of the cervix.

REFERENCES

1. Disaia, P. J., Morrow, C. P. and Townsend, D. E. (1975): *Synopsis of Gynecologic Oncology*, 1st ed., p. 52, New York: John Wiley & Sons.
2. Griffen, T. W., Parker, R. G. and Taylor, W. J. (1976): Amer. J. Roentgenol., **127**, 825.
3. Parker, R. G. and Friedman, R. F. (1966): *Ibid.*, **96**, 100.
4. Van Nagell, J. R. jun., Harralson, J. D. and Roddick, J. W. jun. (1972): Amer. J. Obstet. Gynec., **117**, 938.
5. Van Nagell, J. R. jun., Sprague, A. D. and Roddick, J. W. jun. (1975): Gynec. Oncol., **3**, 87
6. Disaia, P. J., Morrow, C. P. and Townsend, D. E. (1975): *Op. cit.*,[1] p. 4.
7. Morton, D. C. and Dignam, W. (1952): Amer. J. Obstet. Gynec., **64**, 99.