PREVENTION OF UROLOGICAL COMPLICATIONS AFTER RADICAL OPERATION OF CERVICAL CARCINOMA

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SUMMARY

Cervical carcinomas of stage Ib and II have been treated for extended radical therapy by radioisotope radical surgery at the First Department of Obstetrics and Gynecology, University of Vienna, Austria. This extension of a more radical surgery requires to take measures in order to prevent urological and other postoperative complications. Chromocystoscopy, intravenous urography and functional scintigraphy of the kidney are carried out as routine preoperative investigations. Preservation of the adureter and an exact drainage of the field of operation are taken as intraoperative measures. Main emphases of postoperative prophylaxis is the stimulation of ureter activity by distigminbromide and hexoprenaline. Distigminbromide stimulates the prevesical part of the ureter and increases the number of urinary excretions into the bladder. Hexoprenaline is a betamimetic substance which increases both local blood flow and number of ureter contractions.

In addition, treatment by antibiotics, thrombosis prophylaxis with heparin and marcoumar and urine drainage by catheter are performed dur'ng surgery. The results of 187 radioisotope radical operations show that an uretero vaginal fistula was observed ruly in one patient (0.53%). Hydronephrosis was registered in 10 females (5.3%) and 42 subjects (22.5%) lack of bladder feeling was noted and incontinence was observed in 22 patients (11.8%) in the postoperative period.

This report is intended as a contribution to the reduction of urologic and surgical complications following radical surgery for cervical carcinoma at the 1st Department of Obstetrics and Gynecology, University of Vienna. We have come to use the vaginal approach for stage Ia carcinomas, whereas stages Ib and II are handled abdominally. We think that this is the method of choice, since one has to reckon with cancerous regional lymph nodes of the pelvis in the case of a depth of invasion greater than 3 mm and an area of invasion more than 10 mm in its length. The goal to extirpate as many nodes as possible is reached by our method of the radioisotope radical surgery ([5, 6, 7]). The extension of radicality necessites measures for prevention of urological complications. Prior to the introduction of prophylactic measures at the 1st Department of Obstetrics and Gynecology, Vienna, the incidence of ureterovaginal fistulae after conventional Wertheim operations was 5.3% and 5.2% at the First and Second Departments of Obstetrics and Gynecology, respectively. This incidence was about 50% lower than the figures reported by American Authors ([5, 14]) who followed Latzko's example in making use of radical hysterectomy with pelvic lymph node excision.

The Vienna method for the prevention of early urological complications following radical abdominal surgery consists of a number of measures. To discuss them and indicate why they were adopted, the various causative factors underlying postoperative urologic complications will be recalled briefly.

CAUSATIVE FACTORS OF UROLOGIC COMPLICATIONS

1. Factors related to the ureters:

a) Reduced blood supply after isolation and denuding of the ureters.

b) Obstructed outflow attributable to mural edema in the intramural and prevesical portions of the ureter.

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c) Infection, including infection of the renal pelvis and possibly also of the kidneys; it may ascend from the bladder or may originate in the vicinity of the isolated ureter.

d) Reduced postoperative activity of the ureters.

e) Stenosis caused by cicatrization, especially in the vicinity of the bladder inlet.

f) Kinking resulting from adhesions which cause lateral traction on the prevesical part.

2. Factors related to the urinary bladder:

a) Dysfunction caused by changes in tonus and capacity and absence of "bladder feeling" caused by loss of posterior and, in part, of lateral attachments as well as loss of innervation.

b) Infection.

c) Impairment of the sphincter mechanism.

3) Accumulation of blood, serum, lymph, and, later, pus in the paravesical, paravaginal, and pararectal spaces.

Infections may thus spread to adjacent urinary organs. As these factors are responsible for the majority of the urologic complications, except surgical injuries, which occur during the first 3 postoperative months, they were taken as a basis for designing preventive measures. It should be emphasized, however, that some of these measures have long been used by various Authors.

PROPHYLACTIC MEASURES

The prophylactic measures employed at the Departments of Obstetrics and Gynecology at the University of Vienna consist of the following:

A: Preoperative urologic check-up.

Chromocystoscopy, evaluation of ureter activity, complete urocheck, pyelography, blood urea nitrogen. At the First Department of Obstetrics and Gynecology, nephroscintigraphy was to be added in October 1969.

B: Surgical measures.

1. Preservation of adureters, i.e. the vascularized ureteral sheat and formation of a small tissue conus at the ureterovesical junction with its base at the bladder wall. In extended radical operation, the preservation of a tissue bridge between ureter and the pelvic wall – the so-called "Mesureter" – is impossible.

2. Before placing the internal peritoneal suture, provisions are made for active and passive drainage of the hollow spaces created by operation: a Redon ring is inserted into the paravesical spaces and its tangential extension is continued through the vagina and connected to a graded vacuum flask suspended at the bedside. The drains, which are kept in place by chromium catgut sutures, are removed as soon as secretions drop below 10 ml daily. Since March 1973 we have performed the gamma camera radioisotope radical surgery and have applied an additional suction Redon drainage at both pararectal cavities. This guarantees an area of surgery completely free of exudation (fig. 1).

3. Optimal surgical technic hemostasis (to prevent factor 3).

4. Insertion of a Foley catheter into the urinary bladder.

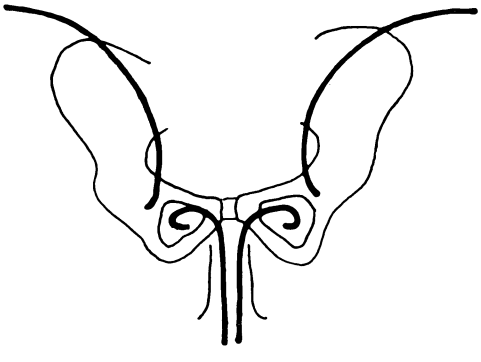

Fig. 1. — Suction drainage through the vagina and through the lateral abdominal wall.

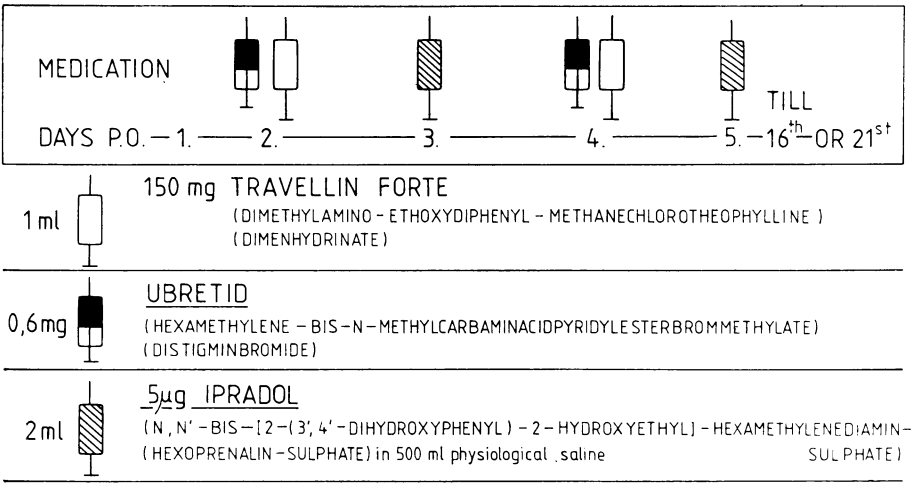

Fig. 2. — Scheme of Ubretid and Ipradol - Prophylaxis for a patient of 60 kg body weight.

POSTOPERATIVE PROPHYLAXIS

1. Drainage of the bladder is continued to the 14th postoperative day (to prevent factors 1c and 2 b).

2. Preventive antibiotic therapy: *Gramaxin* ® (cefazolin) 2 g b.i.d., and *Refobacin* ® (gentamycin sulphate) 40 g b.i.d., are administered one day before surgery and continued through the 2nd postoperative day. On day 3 after surgery, patiens receive *Furadantin* ® (nitrofurantoin), 1 coated tablet b.i.d.

3. Promotion of ureter activity by drugs (fig. 2). On the 2nd postoperative day, 0.1 mg/10 kg body weight of *Ubretid* ® (distigminbromid), a long acting cholinesterase inhibitor, is injected s.c. In addition, *Travellin* ® (similar to Dramamine), 150 mg is given s.c. to counteract occasionally occuring nausea. For *Travellin* ® injections, a separate syringe should to 16th or 21th postoperative day. One day in between to *Ubredit* ® - *Travellin* ® injections, 2 ml (i.e. 5 µg *Iprado* ® Hexoprenalinsulfat) is administered s.c.

Our own roentgencinematography investigations of the ureter after radical surgery prove that distigminbromide (Ubretid ®) stimulates the prevesical part of the ureter and increases the frequency of micturition ([3]). The action of hexoprenalin (Iprado ®) on the uropoietic system by reducing the complications after surgery is not fully understood at present. But, one of its action is vasodilatation. which results in hyperemia when the adureter is preserved. This may result in a synergistic action of the alternately applied Ubretid ®.

Furthermore, an influence is feasible on the reactive hypertension of the bladder resulting in atony as reported by Halter and Richter ([9]) via beta sympathicomimetic receptors in the vesicular wall. This could stop the known reflux in 7% of subjects and thus remove another component of urological complications. Other explanations are possible but they are speculation and will not be discussed here. We hope that both clinical and experimental investigations will shed more light on the mechanism of action.

4. A sporadic intolerance to Ubredit ® had been observed and its use has had to be discontinued in some patients, we recently started using intravenous (i.v.)

Table 1. — *Urological complications after radioisotope radical surgery of cervical carcinoma.*

Period and Treatment	Radioisotope Radical Surgery n.	Ureteric Fistula	Hydro-nephrosis	Missing feeling of the bladder	Urinary Incontinence	Residual urin >3 weeks
1974 - 78 UBRETID	124	1 (bilat.) (0,8%)	8 (6,5%)	33 (26,6%)	17 (13,7%)	7 (5,6%)
1979 - 81 UBRETID+ IPRADOL	63	/	2 (3,2%)	9 (14,3%)	5 (7,9%)	3 (4,8%)
1974 - 81 total	187	1 (0,5%)	10 (5,3%)	42 (22,5%)	22 (11,8%)	10 (5,3%)

mannite solution as an alternative to Ubredit®. Five hundred cubic centimeters of a 10% mannite solution are administered by slow i.v. infusion for 1 or 2 hr. after administration of up to 1 000 cc. of tetraethylammonium chloride and sodium chloride with potassium in the form of 500 cc. of Ringer's solution. As with Ubredit®, the resultant increase in diuresis is seen to go hand in hand with an enhancement of the ureteral contraction rate, which is usually reducted postoperatively. On account of possible interference with the electrolyte balance and a potential circulatory as well as renal overload, mannite application as substitute for Ubredit® is, of course, limited. Apart from that, mannite infusions are indicated whenever the amount of urine voided daily drops under 1000 cc. despite normal fluid intake.

5. Set bed-end upright in order to obtain a better drainage of wound and lymph secretion.

Some of the prophylactic mesures outlined equally serve to prevent postoperative surgical complications. This statement applies particularly to prolonged cholinesterase inhibition, which prevents both postoperative meteorism and intestinal paralysis, a dreaded complication after prolonged surgical procedures.

RESULTS

Table 1 shows the complications associated with radical removal of cervical carcinoma using a radionuclide technique in the modification by Latzko for the period between 1974 and 1978. For stimulation of the ureters with the Vienna method, only Ubredit® was applied at that time. In some instances, Mannitol was administered in association with Ubredit®. During the second period under review, i.e. 1979 to 1981, patients were treated as indicated, but additionally received Ipradol®.

The results of 187 radioisotope radical operations show that an uretero vaginal fistula was observed ruly in one patient (0.53%). Hydronephrosis was registered in 10 females (5.3%), in 42 subjects (22.5%) lack of bladder feeling was noted and incontinence was observed in 22 patients (11.8%) in the postoperative period. In both series the incidence of necrotic ureterovaginal fistulas, hydronephrosis, absence of a bladder feeling, relative urinary incontinence and prolonged residual urine was substantially lower than in earlier studies. Residual urine was thought to be prolonged, if present 3 weeks after removing indwelling catheters. In one third of patients, absence

of a bladder feeling was associated with relative urinary incontinence. The first series of cases treated between 1974 and 1978 had received radioactive gold, 100 μCie/extremity, for labeling lymph nodes [5].

In the second series, technetium antimony sulphide, 500 μCie/extremity, was used for labeling lymph nodes [6]. All patients of the first series received heparin, 5,000 units t.i.d., on the first through third postoperative days and were then switched to Marcoumar ®. In addition, Pantinol ® (a kallikrein inactivator as protease inhibitor), continued through the 5th postoperative day.

DISCUSSION

The principal disadvantage of extended radical abdominal surgery for carcinoma of the uterus as compared with other surgical techniques is that it is usually associated with a higher incidence of urological complications. For instance, ureterovaginal fistulae have been reported in 10 to 14% of cases [11, 14, 15]. Even in recent years this rate of incidences has continued to be high ranging up to 10% [1, 2, 8, 10, 13, 16].

Although mortality resulting from circulatory failure and shock, as well as the incidence of peritonitis, has become negligible as compared to that at Wertheim's and Latzko's times, the incidence of ureterovaginal fistulae attributable to necrosis remained unchanged up to the beginning of 1960. As it was 50 years ago, this resulted in opposition, and many gynecologists and surgeons were skeptical about extension of the original radical abdominal operation. They maintained, and their arguments were not unfounded, that the increased urologic morbidity, which, at times, necessitated extensive secondary operations, such as ureteral implantation into bladder, flaps, offset any potential improvement in the 5-year cure rates. The above argument, however, has largely been disproved by the improvement in survival rates in Stage II carcinomas following the introduction of the radical abdominal procedure. Since 1960, it has lost its significance entirely, as we have succeded, in developing the Vienna method for minimizing the dreaded urologic complications.

In conclusion, preservation of the periureteric tissue, painstaking suction drainage of the paravesical and pararectal fossae, improvement of ureteric motility by using our medication or by oxytocin as Marzetti [12] reported antibiotic caver and last but not least, antithrombotic treatment have all contributed to a reduction of urologic and other complications.

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