Perineal and Bladder Necrosis Following Bilateral Internal Iliac Artery Ligation

Report of a Case

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Abdominoperineal resection with pelvic sidewall dissection is not uncommonly performed for treatment of bulky primary or locally recurrent rectal neoplasms. Usually, the internal iliac arteries and veins are ligated bilaterally early in the course of the procedure to reduce intraoperative blood loss and to facilitate subsequent dissection of the pelvic sidewalls. No complications related to bilateral internal iliac artery ligation in this setting have been described previously. In this report, profound vesical and perineal necrosis after bilateral internal iliac artery ligation occurred in a female patient operated on for recurrent rectal cancer. If the internal iliac artery is ligated below the take-off of the gluteal vessels, perineal necrosis can be prevented. [Key words: Rectal cancers; Pelvic irradiation therapy; Perineal necrosis; Bladder necrosis; Internal iliac artery]

Report of a Case

A 71-year-old woman with a 15-year history of adult onset diabetes and hypertension was referred for treatment of recurrent rectal carcinoma. Three years prior to referral, she had undergone a low anterior resection for a moderately differentiated rectal adenocarcinoma that had invaded the muscularis propria and had metastasized to one of 15 lymph nodes in the specimen. After an uneventful recovery, she was treated with 4000 rads of external pelvic irradiation.

The patient did well until three months prior to referral to our institution when a rectal mass was noted on physical examination. Further evaluation with sigmoidoscopy, barium-enema, intravenous pyelography, and computerized tomography of the pelvis showed a mass arising from the previously stapled suture line. No extrapelvic malignancy was noted on the remainder of the work-up for metastases.

After suitable mechanical and antibiotic bowel preparation, the patient was brought to the operating theater where the distal colon and rectum with the attached mass, as well as the uterus and posterior wall of the vagina, were resected. Early in the course of the dissection, the internal iliac arteries and veins were ligated bilaterally just distal to their take-off from the common iliac arteries. Because of extensive irradiation fibrosis in the pelvis, dissection was difficult. As a result of this, an end sigmoid colostomy and closure of the anal stump was done (Hartmann procedure).

Postoperatively, the patient did well until day 4, when the skin of her perineum was noted to be mottled and dusky; by day 7, it was frankly necrotic and demarcated at 6 cm from the anus (Fig. 1). The indwelling Foley catheter was removed on day 10; thereafter, she was totally incontinent of urine. Urologic evaluation with intravenous pyelography, cystography, and cystoscopy showed a totally necrotic urinary bladder and vaginal remnant as well as right ureteral obstruction. Proximal urinary diversion via right percutaneous nephrostomy was attempted, but was unsuccessful.

The patient's general condition deteriorated as the extent and depth of her perineal and buttock necrosis increased. Despite vigorous nutritional and respiratory support, ongoing metabolic and septic deterioration progressed. This was thought secondary to both ureteral obstruction and extensive soft tissue necrosis with sepsis. No further surgical procedures were attempted; the patient expired 70 days postoperatively.

Postmortem examination confirmed the diagnosis of bladder, vaginal, perineal and buttock necrosis. Additionally, both distal ureters, which had been mobilized directly off the tumor mass, were ischemic and stenotic.

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Discussion

Several authors advise early ligation of the internal iliac arteries during resection of extensive rectal malignancies.[1-3] With a large number of such patients treated by these authors, no instance of perineal, buttock or vesical necrosis has been reported. Bilateral internal iliac artery ligation has been performed for massive pelvic hemorrhage from trauma,[4] and gynecologic malignancy,[5,6] and during radical cystectomy for bladder carcinoma.[7] In these reports no reference is made to either vesical or perineal necrosis as seen in our patient. The only reported complications of this procedure have been buttock claudication[7] and impotence.[8]

Circulation to the pelvic viscera and sidewalls after bilateral internal iliac artery ligation has been well studied by several authors[1,4,9] and includes collaterals from five major sources: 1) the ovarian arteries, 2) the inferior epigastric arteries, 3) the superior hemorrhoidal arteries, 4) the circumflex and perforating branches of the profunda femoris artery, and 5) the lower lumbar arteries. In

FIG. 1. A 71-year-old woman underwent resection of a recurrent rectal cancer with bilateral internal iliac artery ligation. Photograph taken ten days postoperatively showing full-thickness skin and buttock necrosis.

this patient, sources 1, 3, and 5 were surgically interrupted during the first or second operations. Further, it is likely that this patient's preexisting triad of diabetes, long-standing hypertension, and pelvic irradiation contributed to significant small vessel disease in the pelvis and rendered the remaining collaterals insufficient to perfuse the pelvic sidewalls and residual viscera.

Given the devastating results of bilateral internal iliac artery ligation in this patient, we feel this surgical maneuver should not be used in patients with known vascular disease or in patients with prior pelvic irradiation. Additionally, as suggested in the urologic literature,[7] ligation of the internal iliac arteries distal to the take-off of their first major branches, the superior and inferior gluteal arteries, is advised (Fig. 2). If bilateral internal iliac artery ligation is performed, the vascularity of all residual pelvic viscera should be carefully evaluated. If any doubt as to their viability exists, total pelvic exenteration and urinary diversion should be performed.

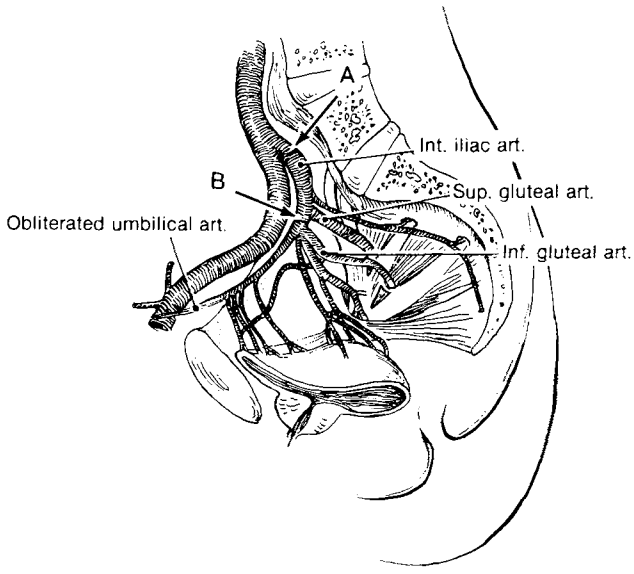

FIG. 2. Schematic drawing of the pelvic blood supply showing the origin of the superior gluteal artery from the internal iliac artery. Ligation and division at point B, rather than at point A, spares the blood supply to the buttocks and perineum.

With the increasing use of wide-field, high-dose irradiation for advanced rectal cancer, a greater number of radiation recurrent tumors will be encountered. Optimal local treatment for patients without evidence of systemic disease has not yet been determined. It may be that pelvic extenteration is the procedure of choice for radiation-recurrent rectal cancer in all patients with local regional disease.

References

1. Engel GC, Singmaster L. Ligation of internal iliac arteries to facilitate abdominoperineal resection for malignancy of the rectum. Surgery 1962;52:867-70.
2. Bacon HE, Gutierrez RR. Cancer of the rectum and colon: review of 2,402 personal cases. Dis Colon Rectum 1967;10:61-4.
3. Swinton NW, Moszkowski E, Snow JC. Cancer of the colon and rectum: a statistical study of 608 patients. Surg Clin North Am 1959;39:745-52.
4. Seavers R, Lynch J, Ballard R, Jernigan S, Johnson J. Hypogastric artery ligation for uncontrollable hemorrhage in acute pelvic trauma. Surgery 1964;55:516-9.
5. Salzberg AM, Fuller WA, Hoge RH. The surgical management of profuse hemorrhage from uterine carcinoma. Surg Gynecol Obstet 1953;97:773-5.
6. Reich WJ, Nechtow MJ. Ligation of the internal iliac (hypogastric) arteries: a life-saving procedure for uncontrollable gynecologic and obstetric hemorrhage. J Int Coll Surg 1961;36:157-68.
7. Skinner DG. Technique of radical cystectomy. Urol Clin North Am 1981;8:353-66.
8. Gittes RF, Waters WB. Sexual impotence: the overlooked complication of the second renal transplant. J Urol 1979;121:719-20.
9. Seigel P, Mengert WF. Internal iliac artery ligation in obstetrics and gynecology. JAMA 1961;178:1059-62.