Case Report

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Large-Bowel Perforation

A Rare Complication of Intravesical Nd-YAG Laser Irradiation of Bladder Tumors

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Key Words

Bladder cancer

Neodymium-yttrium aluminum garnet (Nd-YAG) laser

Bowel perforation

Abstract

A case report of large-bowel perforation after intravesical neodymium-yttrium aluminum garnet laser irradiation is presented. Recommendations to prevent bowel injury are discussed.

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Introduction

Under ideal conditions the penetration depth of the neodymium-yttrium aluminum garnet (Nd-YAG) laser in the bladder is about 4 mm, allowing safe handling without a risk of perforation [1]. However, under certain conditions (high power output, prolonged continuous treatment times, thin bladder wall, etc.) high temperatures can be noted in the adjacent organs. Since the bowel is more susceptible to heating effects than the bladder, bowel perforations can occur without bladder wall perforations [2]. This was seldom encountered and was always attributed to high power outputs from about 50 to 90 W [3, 4]. The symptoms of acute abdomen presented within 12 h to 7 days, and laparotomy was always necessary.

Case Report

A 58-year-old male patient on chronic dialysis for 4 years due to phenacetin abuse presented with a history of macroscopic haematuria for 1 month. In his past history we noted a partial small-bowel resection and appendectomy for perforated appendicitis. Cystoscopy showed four large tumours (3–5 cm in diameter) on bladder dome and right and left lateral wall. Biopsies were performed, and the lesions were treated with Nd-YAG laser coagulation. A total amount of 27,000 J was delivered at 35 W for 2 s. Histological examination showed a poorly differentiated intramucosal transitional cell carcinoma. The bladder catheter was removed after 24 h. The patient was fit for leaving the hospital after 2 days, but preferred to stay until his next dialysis session 3 days later. On the 6th day he had fever (39 °C) and signs of peritonitis in the right flank. Laparotomy was performed which showed extensive adhesions of the small bowel in the pelvis and a perforation

of the sigmoid lying in close contact with the bladder. In view of the patient's history bilateral nephroureterectomy and cystoprostatectomy were performed together with sigmoid resection.

Discussion

To our knowledge this is the second report on large-bowel perforation after intravesical Nd-YAG laser irradiation.

Smith [5] reported a case of sigmoid perforation 2 weeks after laser therapy, but without evidence of the laser being really responsible. Small-bowel perforations have been more frequently encountered [3,4]. This might be due to intrinsic tissue differences between large and small bowel and differences in heat sensitiveness [2].

Bowel perforations most often are due to inadequate use of the laser. Generally, powers of less than 40 W are applied for 2 s and most of the perforations occurred with high power outputs. Lower power and more prolonged application times could possibly diminish the perforation risks. There are also individual anatomical

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reasons such as bowel adhesions in the pelvis after radiotherapy or surgery. In these cases one should be very suspicious, and the risk of perforation could be minimized by placing the patients in Trendelenburg's position, by using a small amount of irrigation fluid to preserve the bladder wall thickness, and by replacing this fluid frequently to maintain a sufficient cooling effect. Following these guidelines we encountered no further complications in the palliative treatment of invasive bladder cancers, neither after radiotherapy nor after abdominal surgery.

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