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Letter to the editor

Postirradiation intraabdominal adhesions

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Introduction

Intraabdominal adhesions are most frequent cause of small bowel obstruction[1] and female infertility.[2] They can be localised in any part of the bowel, but most usually they are found in the small bowel.[1] They occur most frequently after surgery in the abdominal cavity, seldom they are caused by peritoneal infection and even more rarely they follow irradiation of this region.[3]

Various experiments have been conducted for intraabdominal adhesion prevention in the past, but none gave satisfactory result.[4] Recently, two new, more physiologically oriented approaches were introduced. The first is based on local administration of recombinant tissue plasminogen activator[5] and the second on the use of surface active material.[6] In the present article we would like to discuss the problem of postirradiation intraabdominal adhesions in the light of the use of surface active materials.

Postirradiation intraabdominal adhesions

Chronic postirradiation enteritis is most often a disease of middle aged women treated by irradiation for gynecologic carcinoma.[7] Less frequently it is observed in older men treated for prostatic cancer[8] and in younger men treated for malignant testicular tumors.[9] The latent period between irradiation and appearance of the first symptoms of irradiation enteritis is very variable: it ranges form half a year to 31 years, being about 6 years on average.[10]

In the past, little attention was devoted to the problem of postirradiation adhesions. The bulk of the research on chronic postirradiation enteritis was centred on the mucosa or the bowel wall. Thus, chronic postirradiation enteritis was found to appear as a mucosal damage (ulcerations and fissures), or as a generalised fibrosis of the bowel wall with special emphasis on the submucous layer, and as a damage of the vessels resembling those at atherosclerosis.[10] The injury is frequently localised as jejunitis, ileitis or proctitis, but most often it is a combination of all previously mentioned localisations. It is expressed clinically as malabsorption, or bowel obstruction, which is mainly due to intraabdominal adhesions, or as bleeding on the stool.

At operation, the surgeon is faced by a difficult situation. At the beginning of surgery, slow and meticulous adhesiolysis is done; afterwards, resection and anastomosis of the bowel are performed if necessary. After this first intervention there are frequently recurrences of adhesive ileus. In these cases, subsequent sur-

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gery is even more difficult than the first one and carries significant mortality. Therefore it would be highly warranted to prevent the recurrence of adhesive ileus.

Recently, it was realised that the studying of bowel serosa is the key to the solution of the problem of adhesive obstruction after irradiation.[3] Thus, it was observed in a rat model that intraabdominal adhesions began to from two months after abdominal irradiation with a single-dose of 13.5 – 17.5 Gy. They were associated with a concurrent serosal destruction. Postirradiation adhesions were even more expressed when there was inflammation present, or after a surgical procedure in this region.[11]

Surface active materials

Surface active materials are present in the peritoneal fluid in a concentration from 11 to 25 mg/L. Its relative concentration is: 81 % phosphatidylcholine, 5 % lysophosphatidylcholines, 6.5 % sphyngomyelines, 3.5 % phosphatidylinositols and 4 % phosphatidyletanolamines.[12] It was postulated that phospholipid adheres to both parietal and visceral peritoneal surfaces and is held in place by the attraction of the positive charge of choline head to the negative charge of peritoneal surface. To the cavity long-chain fatty acids are presented and interacting with their counterparts from opposing side provide lubrication.[12]

We have found out in animal experiments that the surface active materials effectively prevent adhesions after surgery,[6] adhesions after intestinal anastomosis[13] and those after bacterial peritonitis.[14] Therefore they could be instilled in the peritoneal cavity after the adhesiolysis in postirradiation adhesive ileus.

Postirradiation adhesions prevention by surface active materials

Surface active materials efficiently prevent intraabdominal adhesion formation only when instilled intraperitoneally, but not when applied intravenously.[6] When applied intraperitoneally, special attention should be paid to possible formation of intestinal anastomosis, since too high a dosis could lead to anastomotic dehiscence and peritonitis.[13]

The next question applies to the appropriate timing of surface active material application. Thus, application after irradiation does not seem wise since only about 5 % of patients later develop chronic irradiation enteritis. It seems much more possible to use them after the adhesiolysis for adhesive obstruction. In this case they could be instilled intraperitoneally at the end of the operation. This would be in line with experimental evidence that single dose of surface active material at the end of operation is as efficient as three doses in three consecutive days.[13]

It seems that surface active materials could play an important role in postirradiation adhesion prevention. Therefore, they bring the new light of hope for patients with this grave and often fatal disease.

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