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Intraoperative apparatus-based blood reinfusion in the aspect of oncological safety in patients with renal cell carcinoma complicated with tumor venous thrombosis

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Abstract

Aim: Determine the role of intraoperative apparatus-based blood reinfusion in the aspect of oncological safety in patients with renal cell carcinoma, complicated with tumor venous thrombosis.

Material and Methods: The results of cytological examination of tumor contamination of blood sediment material from the surgical field during the cavotomy and washed erythrocytes after processing with the use of «Medtronic Autolog» device were analyzed in 8 patients with renal cell carcinoma, complicated with tumor thrombosis of the inferior vena cava, who were hospitalized to the Vascular surgery department of Lviv Regional Clinical Hospital for the period from 2017 to 2019: 6 (75.0%) men, 2 (25.0%) women, median of age 59.5 (49-72) years. The blood sent for research was centrifuged. From the sediment material the smears were prepared, stained with hematoxylin-eosin and examined through the Nikon E200 optical microscope with Nikon D5000 camera.

Results and Discussion: At radical nephrectomy with thrombectomy from the inferior vena cava a cytological examination of the blood sediment material from the operative field during the cavotomy revealed the presence of peripheral blood elements, among which in 4 cases it was possible to visualize the tumor cells. Also in 5 cases an accumulation of neutrophilic leukocytes, single lymphocytes was revealed. The results of cytological examination of sediment material of washed red blood cells after processing with «Medtronic Autolog» device in all 8 cases have revealed the presence of only erythrocytes. Thus, the obtained results suggest that intraoperative reinfusion of washed red blood cells using the «Medtronic Autolog» device may provide the necessary ablastics by preventing tumor cells and leukocytes from entering the patient's bloodstream.

Conclusions: Intraoperative reinfusion of washed erythrocytes in patients with renal cell carcinoma, complicated with tumor venous thrombosis, during radical nephrectomy and thrombectomy from the inferior vena cava can significantly reduce the need for donor blood in compliance with the requirements of ablastics.

Keywords: Blood reinfusion, oncological safety, thrombosis

Introduction

The problem of compensating acute intraoperative blood loss in patients with renal cell carcinoma (RCC), complicated with thrombosis of the inferior vena cava (IVC), is due to the high cost of donor blood, the risk of infectious complications, microcirculatory disorders, the possibility of hemolysis, coagulopathies and immunosuppression. The known method of intraoperative reinfusion using the «Haemonetics Cell Saver» and «Medtronic Autolog» autotransfusion devices, the main advantages of which is the maximum reduction of blood loss during surgical intervention due to the constant intravenous return of concentrated washed red blood cells, the absence of negative influence on the coagulating system and severe immune reactions, arising from the transfusion of donor blood products [7, 8]. However, in surgical oncology the reinfusion of washed red blood cells, using the cell-saving devices, is rarely used, which is associated with the possibility of hematogenous metastasis [2, 3]. Nevertheless, there is no convincing evidence that intraoperative reinfusion may cause tumor dissemination or affect the prediction of cancer, and a number of studies over the past years point to the safety of autohemotransfusion in oncosurgical patients using leukocyte filters [1, 5, 9].

Aim

Determine the role of intraoperative apparatus-based blood reinfusion in the aspect of oncological safety in patients with RCC, complicated with tumor venous thrombosis.

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Material and Methods

The results of cytological examination of tumor contamination of blood sediment material from the surgical field during the cavatomy and washed erythrocytes after processing with the use of «Medtronic Autolog» device were analyzed in 8 patients with RCC, complicated with tumor thrombosis of the IVC, who were hospitalized to the Vascular surgery department of Lviv Regional Clinical Hospital for the period from 2017 to 2019: 6 (75.0%) men, 2 (25.0%) women, median of age 59.5 (49-72) years. The blood sent for research was centrifuged. From the sediment material the smears were prepared, stained with hematoxylin-eosin and examined

through the Nikon E200 optical microscope with Nikon D5000 camera.

Results and discussion

At radical nephrectomy with thrombectomy from the IVC a cytological examination of the blood sediment material from the operative field during the cavatomy revealed the presence of peripheral blood elements, among which in 4 cases it was possible to visualize the tumor cells (Fig. 1-2). Also in 5 cases an accumulation of neutrophilic leukocytes, single lymphocytes was revealed.

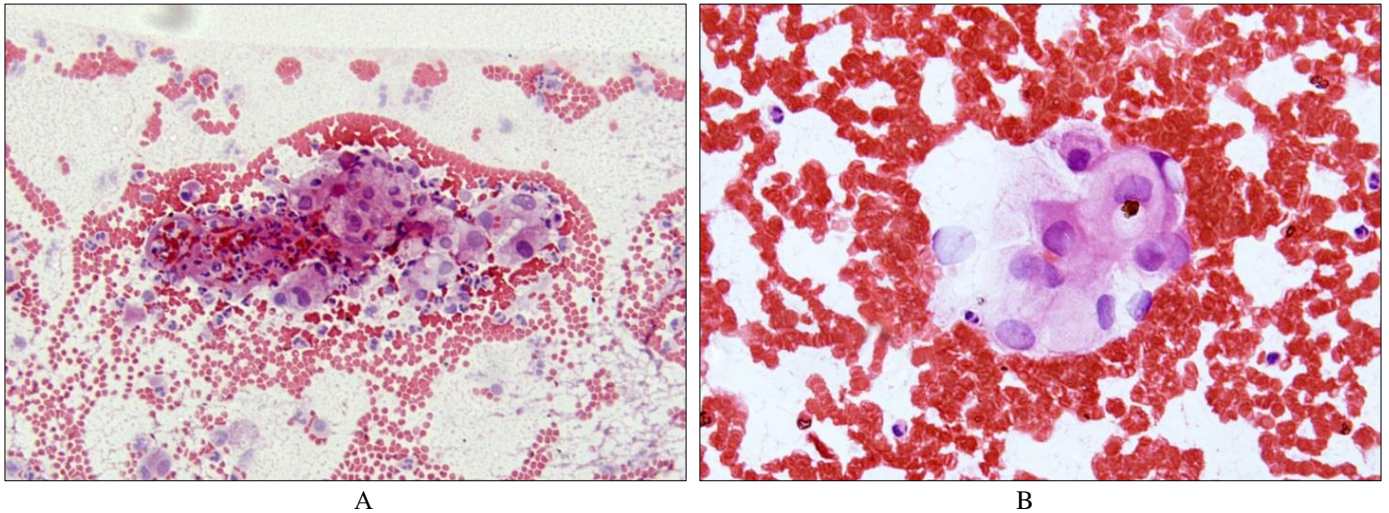


Fig 1: Blood from the abdominal cavity. The accumulation of tumor cells among blood cells. Hematoxylin-eosin stain, x100 (A), x400 (B)

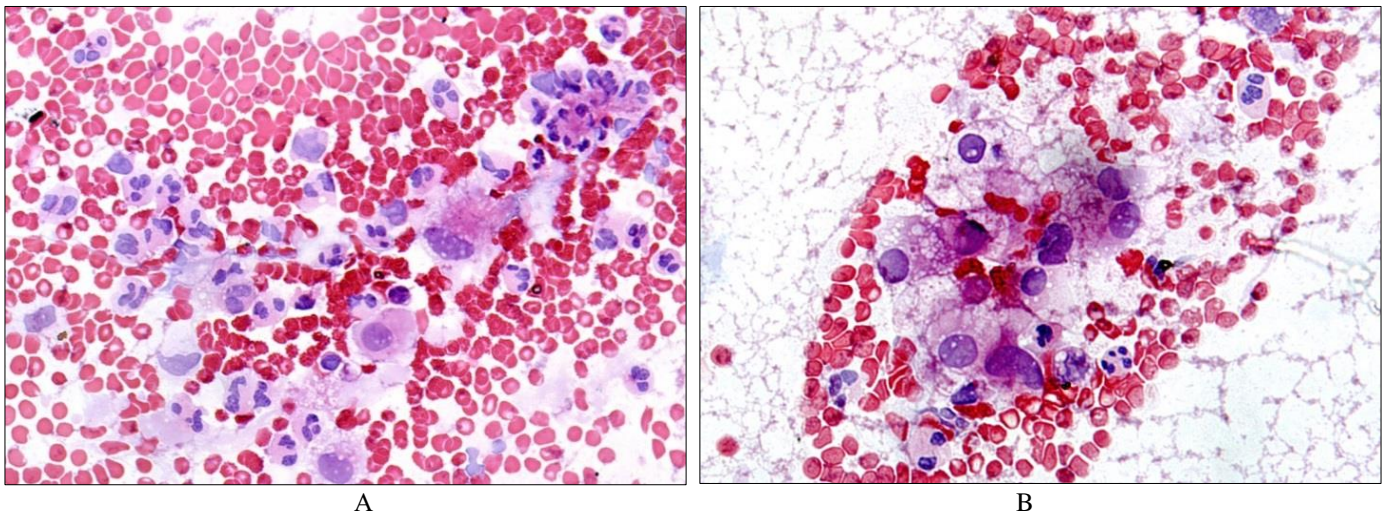


Fig 2: Blood from the abdominal cavity. The accumulation of tumor cells among blood cells. Hematoxylin-eosin stain, x100 (A), x400 (B)

The results of cytological examination of sediment material of washed red blood cells after processing with «Medtronic Autolog» device in all 8 cases have revealed the presence of only erythrocytes (Fig. 3).

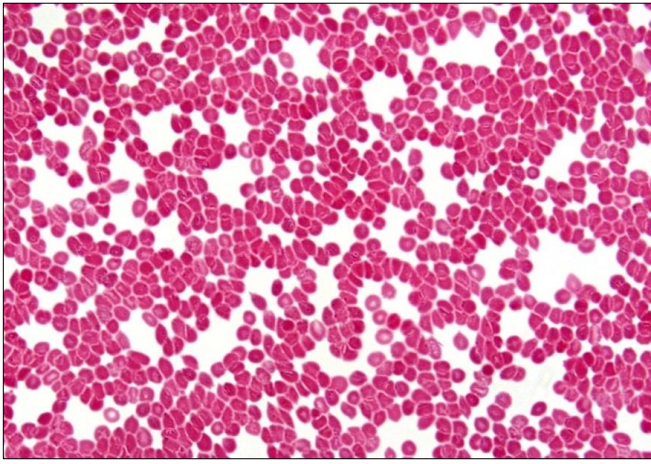


Fig 3: Blood from the abdominal cavity after processing with «Medtronic Autolog» device. Only red blood cells. Hematoxylin-eosin stain, x400.

Initially, in surgical oncology, intraoperative reinfusion of washed red blood cells was rarely used, which was associated with the possibility of hematogenous dissemination of tumor cells [4, 5]. According to Klein A.A. *et al.* [6] there are no absolute contraindications for reinfusion in oncology. Circulating malignant cells are often present in cancer patients undergoing radical surgical intervention, regardless of intraoperative reinfusion use, and very few of these cells are thought capable of causing metastases [4]. At the same time, a number of studies indicate the safety of autohemotransfusions in oncology with using leukocyte filters. In particular, a meta-analysis conducted by Waters *et al.* [10] revealed that intraoperative reinfusion is not associated with an increased risk of tumor dissemination. On the contrary, the equivalent and better results were reported in patients with various types of cancer, in whom during the operation the autohemotransfusion was performed.

Thus, the obtained results suggest that intraoperative reinfusion of washed red blood cells using the «Medtronic Autolog» device may provide the necessary ablastics by preventing tumor cells and leukocytes from entering the patient's bloodstream.

Conclusions

Intraoperative reinfusion of washed erythrocytes in patients with RCC, complicated with tumor venous thrombosis, during radical nephrectomy and thrombectomy from the IVC can significantly reduce the need for donor blood in compliance with the requirements of ablastics.

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