

# Pelvic Artery Embolization In Patients With Cervical Cancer Complicated By Hemorrhage: Single-Institution Experience In Belarus

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## INTRODUCTION

Cervical cancer (CC) is the second most common cancer among women worldwide, with around 600,000 new diagnoses and 300,000 deaths per year (GLOBOCAN 2018). CC is a leading cause of cancer morbidity in women globally. In 2018, in the Republic of Belarus the morbidity and mortality rate from CC were 11.2 and 4.2 per 100,000 of female population, respectively. In addition, 33.9% of cases of CC in Belarus are diagnosed at advanced stages (III-IV) of disease, and the majority of women presenting have at least locally advanced (stage IB2 or greater) disease.

One of the serious complications of locally advanced CC is hemorrhage from tumor. In 11% of patients vaginal bleeding can be massive and life threatening. This requires emergency hemostatic interventions, and therefore interrupts or delays antineoplastic therapy. This leads to a poorer prognosis. Bleeding is the immediate cause of death in 6% of women with CC. Management of hemorrhage often poses a challenge.

The recent advances in angiography have made it possible to control pelvic hemorrhage through radiologically guided occlusion of the branches of the internal iliac arteries. In gynecologic oncology practice up to the present time, pelvic artery embolization (PAE) has generally been deemed to be a palliative procedure and not as a component of antitumor therapy. In our experience, PAE can also be used to stop bleeding before proceeding or continuing anticancer therapy.

## OBJECTIVES

The purpose of this study was to investigate the efficacy of PAE in patients with locally advanced and recurrent CC complicated by hemorrhage.

## METHODS

A retrospective study was performed of consecutive 81 patients. 68 patients had primary locally advanced CC and 13 patients were admitted with recurrent disease. Stage IIB was diagnosed in 10 patients and stage IIIB in 50 patients. There were only two patients with stage IVA of the disease and they were therefore analyzed together with patients with stage IVB disease with total of 18 patients.

Pelvis angiography was conducted according to standard method using catheterization of femoral or axillary artery using the Seldinger technique. Embolic agents were used in various combinations to achieve full occlusion of the involved vessels. If it was technically possible, radiological endovascular hemostasis was performed on both sides. Otherwise a unilateral procedure was performed.

Basic descriptive statistics were used to describe the patients' clinical characteristics. Survival rate was calculated according to Kaplan-Meier method. A log-rank test was used to compare survival rates between two groups, in 3 groups –  $\chi^2$  criterion was used. All p values were 2-sided, with a p-value < 0.05 considered statistically significant.

## RESULTS

60% of patients had selective embolization of the uterine arteries; in the other cases we performed embolization of the branches of the internal iliac arteries, or other pelvis arteries supplying the tumor.

The procedure was performed bilaterally in 74 patients and unilaterally in 7 patients: on the right side in three patients and on the left side in four patients. In 45 patients selective embolization of the uterine arteries from both sides was performed; in 18 patients we performed embolization of the distal branches of the internal iliac arteries on both sides. In 6 patients embolization of the uterine artery on the one side and the distal branch of internal iliac artery from the other side was performed, either because of a more extensive vascularization in one of the parametria, or because the tumor was not supplied in that side by the uterine artery.

The median operative time of PAE was 103 min (range 40-195 min.) PAE controlled vaginal bleeding in 94% of patients. In 6% of patients hemorrhage recommenced within 1 to 24 days and it required a repeat procedure. There were no serious intraoperative complications associated with the PAE procedures performed.

The difference in survival rates of patients with primary and recurrent CC was not clinically or statistically significant ( $P=0.51$ ). The difference in survival rates of patients with primary disease by stage of disease was statistically significant ( $P<0.001$ ): one-year adjusted survival rate of stage IIB, IIIB and IV disease was 75% (SE 22%), 54.1% (SE 7.8%), and 10.0% (SE 6.7%), respectively. The 5-year survival rate was 50% (SE 25%), 17.6% (SE 6.7%), and 5.0% (SE 4.9%), median adjusted survival rate was 19.9 months, 12.8 months, and 5.5 months, respectively. The differences in the survival rate were significantly lower for the 32% patients who discontinued cancer therapy compared with the 68% patients who continued treatment. To level the data on differences, comparison of survival rate was conducted for patients with stage IIIB disease, the most represented in the study cohort of patients with primary CC. The median adjusted survival rate was 5.5 months for patients with stage IIIB disease who discontinued cancer treatment and 15.7 months for patients who continued treatment ( $p=0.035$ ).

## CONCLUSION

To the best of our knowledge, this is the largest reported series of PAE of patients with hemorrhage from CC, and the only series to evaluate the effect of this procedure on the continuation of definitive therapy and survival. Our results demonstrate that in patients with locally advanced and recurrent CC complicated by hemorrhage, radiological endovascular embolization of small pelvis arteries has high efficiency – in 94% (95% CI 86-98%) patients the hemorrhage stopped and only 5 (6%) patients required a repeat procedure. According to our results, the difference in the survival rate of patients with primary and recurrent CC is not clinically and statistically significant ( $P=0.51$ ).

Conduction of special antineoplastic therapy has significant impact on long-term treatment outcomes of primary patients with locally advanced CC, which is impossible in presence of hemorrhage from tumor. Our results suggest that PAE in patients with locally advanced and recurrent CC, complicated by hemorrhage, is well tolerated, minimally-invasive and highly effective and can be used at any stage of treatment in this category of patients. In a significant minority of our patients, definitive therapy was initiated or continued after embolization, and led to significantly improve patient survival.

Pelvic hemorrhage in a patient with advanced or recurrent CC should prompt referral to a specialty center for consideration of PAE.

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