**Research Article**

**Effect of Uterine Arterial Chemoembolization Combined with Ultrasound-Guided Uterine Curettage on Cervical Pregnancy and Influencing Factors**

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This is a retrospective study to analyze the efficacy of uterine artery chemoembolization (UACE) combined with ultrasound-guided curettage in the treatment of cervical pregnancy and the factors affecting the postoperative outcome. A total of 26 subjects were included in the study and were divided into a control group of 12 and an observer group of 14, all patients with cervical pregnancy diagnosed in our hospital from January 2016 to January 2020. Patients in the control group were treated with methotrexate injection (MTX) combined with ultrasound-guided curettage in our hospital, while the observer group was treated with UACE combined with ultrasound-guided curettage. The efficacy of the two groups was evaluated at 3 months postoperatively, and data on patients’ age, days of menopause, pregnancy frequency, and vaginal bleeding were collected retrospectively. Intraoperative bleeding, time to recovery of serum human chorionic gonadotropin (HCG), hospitalization time, time to return to normal menstruation, time to disappearance of gestational sac, pregnancy frequency, presence of endometrial inflammation, gestational week, maximum diameter of gestational sac, thinnest myometrium, endogenous-exogenous type, gestational sac size, and HCG level were recorded in both groups. Single-factor analysis and multifactor logistic regression models were used to analyze the factors influencing the surgical outcomes of patients. The results of the study showed that the overall efficiency of the observer group was significantly higher than that of the control group, while intraoperative bleeding, hospital stay, time to return to normal menstruation, and time to disappearance of the gestational sac were all lower than those of the control group (p < 0.05). The results of univariate and multifactorial analyses showed that endometrial inflammation, gestational week, maximum diameter of the gestational sac, thinnest myometrium, and endogenous-exogenous type could affect the patients’ postoperative recovery (p < 0.05). These results suggest that UACE combined with ultrasound-guided uterine clearance for cervical pregnancy can significantly improve treatment efficacy, reduce intraoperative bleeding, and improve recovery time from postoperative related symptoms. The treatment efficacy of patients with cervical pregnancy was related to the gestational week, the maximum diameter of the gestational sac, and the thinnest muscle layer.

1. **Introduction**

Cervical pregnancy refers to the implantation and development of fertilized eggs in the cervical canal, and the patients mostly show menopause and painless vaginal bleeding [1]. In recent years, the widespread application of uterine cavity operations such as induced abortion has increased the incidence of cervical pregnancy year by year, and the current incidence of cervical pregnancy accounts for 1% of ectopic pregnancies. The important component of the cervix is fibrous tissue, so the implantation of the fertilized egg in the cervix is not stable, and most patients will have a
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mis...
Check the size of the pregnancy sac and measure HCG levels.

Evaluation criteria for efficacy in 3 months after surgery [11] are as follows. Markedly effective: the treatment of pregnancy sac completely discharged, the gestational sac is basically not palpable, and the HCG level is within the normal range. Valid: most of the gestational sacs were eliminated after treatment and HCG dropped to 100 mIU/ml, with a steady decrease in the later stages. Invalid: the size of the gestational sac and the HCG level did not change significantly after treatment, and in some patients, the HCG level even increased. Total effective rate: (number of markedly effective cases + number of valid cases)/total number of cases × 100%.

2.6. Statistical Methods. SPSS22.0 software was used for data processing, and GraphPad Prism 8 was used to make statistical graphs. Measurement data were expressed as mean ± standard deviation. Analysis of variance was used for multiple group comparisons, and the t-test was used for pairwise comparisons. The enumeration data are given as n (%), and the chi-square (χ²) test was performed. The logistic regression model was used for the multivariate analysis. The test level was α = 0.05, and p < 0.05 indicated that the difference was statistically significant.

3. Results

3.1. Comparison of Efficacy. When the efficacy was evaluated 3 months after the end of treatment, 3 cases in the control group were markedly effective (25.00%), 4 cases were valid (33.33%), and 5 cases were invalid (41.67%), with a total effective rate of 58.33%. In the observer group, there were 9 cases with a markedly effect (64.29%), 4 cases with effective valid (28.57%), and 1 case with invalid (7.14%), with a total effective rate of 92.86%. The difference in the total effective rate between the two groups was statistically significant (p < 0.05, Figure 2).

3.2. Comparison of Intraoperative Bleeding and Postoperative Symptom Improvement Time. By comparing the surgical and postoperative recovery of the two groups, we found that the intraoperative bleeding was significantly lower in the observer group than in the control group, and the mean time of serum HCG recovery, hospitalization, return to normal menstruation, and disappearance of the gestational sac were significantly shorter than in the control group (p < 0.05, Figure 3).

3.3. Single-Factor Analysis of Postoperative Recovery in Patients with Cervical Pregnancy. Finally, there were 20 patients with effective treatment and 6 patients with invalid treatment. A comparison of the clinical data of patients with different postoperative outcomes showed that the differences in age, gestation, and initial HCG values of patients with different outcomes were not statistically significant (p > 0.05). The differences in endometrial inflammation, gestational week, maximum diameter of the gestational sac, thinnest myometrium, and endogenous-exogenous type

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**Figure 1:** UACE imaging situation. (a) The right uterine artery is slightly thickened and the spiral artery extends inward and upward. (b) Complete embolization of the left uterine artery. (c) Thickening of the left uterine artery, marked vascular staining in the region of the inferior branch of the uterine artery, and upward pushing of the spiral uterine artery. (d) After the right uterine artery was embolized, the angiogram showed that the uterine artery was not developed and the blood vessel staining disappeared.

**Figure 2:** Comparison of clinical efficacy. The total effective rate of treatment in the observer group was compared with that in the control group, *p < 0.05.
were statistically significant, suggesting that these indicators may be the main factors affecting the recovery of cervical pregnancy after surgery \((p < 0.05, \text{Table 1})\).

3.4. Multifactor Analysis of Postoperative Recovery in Patients with Cervical Pregnancy. The effectiveness of treatment was used as the dependent variable \(Y\) (yes = 1, no = 0), and endometrial inflammation, gestational week, maximum diameter of the gestational sac, thinnest myometrium, and endogenous or exogenous gestational sac were used as independent variables \(X\) and subjected to the multivariate logistic regression analysis. The assigned values are given in Table 2. The multifactor logistic analysis showed that during pregnancy week, the maximum diameter of the sac and the thinnest muscle layer were independent factors influencing the patient’s postoperative recovery \((p < 0.05, \text{Table 3})\).

4. Discussion

The clinical symptoms of cervical pregnancy are mainly menopause and painless vaginal bleeding. Routine gynecological examination showed that the cervix was enlarged and dark blue. At present, the etiology of cervical pregnancy is not yet clear, and it may be closely related to congenital uterine dysplasia, endometrial inflammation, and uterine trauma caused by repeated curettage [12, 13]. B-ultrasound is a commonly used method of cervical pregnancy examination. The serum HCG concentration will increase with the time of pregnancy. The implantation of fertilized eggs in the cervix is often unstable, and most patients with cervical pregnancy abort within 20 weeks of pregnancy [14, 15]. There are abundant blood vessels around the gestational sac, and the embryo will increase its vitality as the gestational age increases, thereby increasing the risk of miscarriage and hemorrhage in patients with cervical pregnancy [16, 17].
The results of this study showed that the total effective rate of treatment in the observation group was significantly higher than that in the control group. In addition, the amount of blood loss, hospital stay, time to normal menstruation, and disappearance of gestational sac in the observation group were significantly lower than those in the control group. The reason is that UACE is a means of interventional treatment, which embolizes blood vessels by injecting embolic agents into the uterine artery to reduce the occurrence of major bleeding. UACE combined with uterine debridement is less damaging to patients with cervical pregnancy, relatively simple to perform, and has less impact on patients’ fertility, allowing for a faster recovery and a more effective improvement in prognosis, making it an acceptable treatment for patients [20, 21].

The results of this study show that endometrial inflammation, gestational age, the largest diameter of the gestational sac, and the thinnest muscle layer are independent influences on the efficacy of surgical treatment and can sensitively predict the failure of surgical treatment of cervical pregnancy. The efficacy of treatment of cervical pregnancy is affected in patients with a gestational week greater than 8 weeks and age stationals ac diameter greater than 2 cm.

| Influencers                        | Number of cases (n = 26) | Efficacy (n = 20) | Invalid (n = 6) | $\chi^2$ value | P value |
|------------------------------------|-------------------------|-------------------|-----------------|---------------|---------|
| Age (years)                        |                         |                   |                 |               |         |
| 20–30                              | 13                      | 11                | 2               | 0.867         | 0.352   |
| 30–40                              | 13                      | 9                 | 4               | 0.462         | 0.497   |
| Pregnancy (times)                  |                         |                   |                 |               |         |
| 0–2                                | 20                      | 16                | 4               | 0.462         | 0.497   |
| 3–4                                | 6                       | 4                 | 2               | 4.339         | 0.037   |
| Inflammation of the endometrium    |                         |                   |                 |               |         |
| No                                 | 14                      | 13                | 1               | 6.635         | 0.010   |
| Yes                                | 12                      | 7                 | 5               | 6.339         | 0.030   |
| Pregnancy week (week)              |                         |                   |                 |               |         |
| 0–8                                | 16                      | 15                | 1               | 6.635         | 0.010   |
| > 8                                | 10                      | 5                 | 5               | 6.339         | 0.030   |
| Maximum diameter of the pregnancy sac (cm) |                |                   |                 |               |         |
| 0–2                                | 18                      | 16                | 2               | 4.339         | 0.037   |
| 2–4                                | 8                       | 4                 | 4               | 6.262         | 0.012   |
| Thinnest muscle layer (mm)         |                         |                   |                 |               |         |
| < 2                                | 7                       | 3                 | 4               | 6.262         | 0.012   |
| > 2                                | 19                      | 17                | 2               | 6.262         | 0.012   |
| Endogenous/exogenous               |                         |                   |                 |               |         |
| Endogenous                        | 12                      | 7                 | 5               | 4.339         | 0.037   |
| Exogenous                         | 14                      | 13                | 1               | 4.339         | 0.037   |
| Initial HCG (mIU/ML)               |                         |                   |                 |               |         |
| < 600                              | 20                      | 16                | 4               | 0.462         | 0.497   |
| > 600                              | 6                       | 4                 | 2               | 0.462         | 0.497   |

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than 3.60 cm. The longer the gestational week, the larger the possible gestational sac or fetus, and the more abundant the local and surrounding blood supply to the sac will be, while the contraction of the muscular layer at the uterine scar is further weakened, making it easy to have postoperative bleeding, incomplete clearance, or residual embryonic tissue, which affects the outcome of the intervention [22, 23]. The thickness of the thinnest muscle layer at the scar is a protective factor for patients with cervical pregnancy, and the thicker the thinnest muscle layer, the less likely patients with cervical pregnancy will experience miscarriage hemorrhage [24].

In summary, UACE combined with ultrasound-guided uterine evacuation for the treatment of cervical pregnancy can significantly improve the efficacy, reduce intraoperative bleeding, and improve the recovery time of postoperative related symptoms. The efficacy of surgical treatment for patients with cervical pregnancy is related to the gestational age, the largest diameter of the gestational sac, and the thinnest muscle layer. The shortcomings of this study are that the selected sample size is too small, and the follow-up time is short. In the future, it is necessary to further increase the sample size and extend the follow-up period to observe the long-term efficacy of this method.

Data Availability
The data used to support the findings of this study are available from all the authors upon request.

Ethical Approval
This study was approved by the Ethics Committee of Changxing County People’s Hospital (2015008).

Disclosure
Xueqin Gong and Yulong Qian are the co-first authors.

Conflicts of Interest
The authors declare that they have no conflicts of interest.

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