Predictive value of CA125, VEGF, β–HCG in the early diagnosis of ectopic gestation and drug conservative treatment prognosis

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1. Introduction

Ectopic gestation is an emergency and severe case common in gynecology, and its morbidity shows rising tendency in recent years which seriously impacts patients’ fertility and life and health[1]. It has important significance to protect the patients’ fertility and ensure patients’ life and health in the early diagnosis of ectopic gestation. At present, β–HCG is a common diadynamic criteria to identify the uterine pregnancy and ectopic gestation in clinic. But the serum level of β–HCG in early ectopic gestation shows no significant change, therefore it is not easy to identify and diagnose the early ectopic gestation, and require the dynamic monitoring over and over again, thus to impact the clinical application value[2]. Recent studies showed that VEGF as the vascular growth factor has an important regulating effect on proliferation of endometrium, involving in the formation of ectopic gestation[3]. CA125 may has a closely relation with tubal mucosa and fetal trophoblast cells in the early gestation, and the increase of CA125 expression level can be observed in trophoblast cell, amniotic fluid and embryonic tissue[4]. Therefore, this paper was to investigate the predictive value of carbohydrate antigen 125 (CA125), vascular endothelial growth factor (VEGF), β-human chorionic gonadotropin ( β–HCG) in the early diagnosis of ectopic gestation and its prognosis of the patients.

2. Materials and methods

2.1. Clinical materials

A total of 128 patients with ectopic gestation treated in our hospital January 2015 to October 2015 were selected as the research object, inclusion criteria: (1) patients were confirmed by surgery and pathology; (2) stages of endometriosis reference to
the endometriosis of American Fertility Society; (3) No treatment was received before participating in the research; (4) age ranged from 20-40 years; (5) patients who can be followed-up regularly (6) patients were all signed the informed consent. Exclusion criteria: (1) patients with abnormal disease in heart, liver, kidney and hemopoietic system, psychiatric history, cardiovascular disease; (2) patients cannot tolerate the hormone; (3) patients who cannot take the medicine as required; (4) patients with serious adverse reaction after taking the drug. Patients age ranged from 20-40 years, with mean age of (29.12±3.25) years; pregnant 1 to 3 times, with average pregnant of (1.8±0.4) times; disease course 2-10 years, with disease course of (28.96±3.08) years. Clinical stages: 42 cases in stage I, 38 cases in stage II, 20 cases in stage III, and 25 cases in stage IV. And 120 patients with normal intrauterine pregnancy were selected as the control group, patients age ranged from 20-42 years, with mean age of (28.96±3.08) years; pregnant 1 to 3 times, with average pregnant of (1.9±0.3). Age and pregnant times in two groups have no statistic difference (P>0.05).

2.2. Methods

2.2.1. Therapeutic method

Patients were treated with marvelon combined with diphereline. Patients were administrated with marvelon 1 pill/day (SFDA Approval No. H20030559, manufacturer: Organon, Netherlands), diphereline (SFDA Approval No. H10950202; manufacturer: Shanghai Pharmaceuticals Co., Ltd., Hualian pharmaceutical factory), 8 mg/d, sustained medication for one month.

2.2.2. The detection of the levels of serum CA125, VEGF and β-HCG

Five milliliter venous blood were took from fasting patients before and after treatment in ectopic gestation group, while 5 mL venous blood of the control group were took from fasting patients when having routine physical examination, centrifuging at 3000 r/min for 20 min, and the blood was kept at -20°C for other test. Serum levels of CA125, VEGF and β-HCG were determined by ELISA, and the VEGF kit was purchased from Shanghai Enzyme-link Biotechnology Co., Ltd., CA125 kit was purchased from Shanghai Open Biotechnology Co., Ltd., while β-HCG kit was purchased from a Shanghai Yiyan Biotechnology Co., Ltd., and the operation was strictly performed according to kit introduction.

3. Results

3.1. Comparison of serum levels of CA125, VEGF and β-HCG in patients of two group

The serum levels of CA125 and VEGF in ectopic gestation group were higher than control group, while the level of β-HCG was lower than the normal control group, and the difference was statistically significant (P<0.05) (Table 1).

3.2. Predictive value of serum CA125, VEGF and β-HCG for drug conservative treatment prognosis

The total effective rate in 125 patients with ectopic gestation was 81.60% (102/125), while the inefficiency was 18.40% (23/125). Serum levels of CA125 and VEGF in ectopic gestation group was lower than control group, while level of β-HCG was higher than inefficiency group (P<0.05) (Table 2).
Increased in uterine pregnancy of the disease outcome in patients with ectopic gestation, the level of CA125 in patients with ectopic gestation was lower than the normal pregnancy group. And this study showed that the serum level of CA125 was significantly increased. With the increase of CA125, therefore, compared to normal pregnancy patients, their serum level of CA125 tended to zero. Considering its possible cause, the CA125 secreted by trophocyte cells was elevated, so as to increase the level of CA125 in peripheral blood.

CA125, VEGF, β-HCG can be used as the evaluation index for the occurrence and disease prognosis of ectopic gestation. In addition, the detection area, sensitivity, specificity, positive predictive value, negative predictive value under the ROC curve were greater than single index detection when combined the detection of serum CA125, VEGF, β-HCG. (Table 3)

Table 3
Clinical diagnosis value analysis of serum levels of CA125, VEGF and β-HCG in patients with ectopic gestation

<table>
<thead>
<tr>
<th>Items</th>
<th>Area under curve</th>
<th>95%CI</th>
<th>Positive predictive value(%)</th>
<th>Negative predictive value(%)</th>
<th>Sensitivity(%)</th>
<th>Specificity(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA125</td>
<td>0.689</td>
<td>0.559-0.702</td>
<td>67.25</td>
<td>82.02</td>
<td>76.25</td>
<td>75.02</td>
</tr>
<tr>
<td>VEGF</td>
<td>0.702</td>
<td>0.698-0.785</td>
<td>71.04</td>
<td>82.05</td>
<td>81.25</td>
<td>78.11</td>
</tr>
<tr>
<td>β-HCG</td>
<td>0.712</td>
<td>0.676-0.796</td>
<td>70.69</td>
<td>83.33</td>
<td>80.33</td>
<td>75.63</td>
</tr>
<tr>
<td>CA125+ VEGF+ β-HCG</td>
<td>0.825</td>
<td>0.812-0.948</td>
<td>88.12 abc</td>
<td>90.33 abc</td>
<td>89.63 abc</td>
<td>94.55 abc</td>
</tr>
</tbody>
</table>

Note: compared with CA125, \( P<0.05 \); compared with VEGF, \( P<0.05 \); compared with β-HCG, \( P<0.05 \).

4. Discussion

Endometriosis is one of common acute abdomen diseases in gynecology, which can cause peritoneal cavity hemorrhage, resulting in hemorrhagic shock and might threaten life in severe cases[6]. With the diagnostic techniques constantly improving in ectopic gestation and the diagnostic method of ectopic gestation continues to improve in clinic, however, seeking a simple and easy way to implement the effective method in the early diagnosis and plan implementation for ectopic gestation has important significance.

β-HCG is a common index used for measuring gestation in clinic. After normal pregnancy and ovulation in 8 to 10 days, the serum level of β-HCG was significant increased. With the increase of gestation age, the normal development of villus will secrete lots of β-HCG, therefore, the serum level of β-HCG was significant increased in uterine pregnancy[7]. However, due to the ectopic gestation patients lack of normal deciduate tissue, combining with the maldevelopment of villus, which resulting in the hyposecretion of β-HCG, therefore, compared to normal pregnancy patients, their serum level of β-HCG was obviously decreased[8]. The results in this study showed that the serum level of β-HCG in patients with ectopic gestation was lower than the normal pregnancy group. And with the disease outcome in patients with ectopic gestation, the level of β-HCG tends to zero. Considering its possible cause, the β-HCG was mainly secreted by chorionic trophoblast cells which is a sign for embryo survival. After the disease outcome in patients with ectopic gestation, the body no longer contains chorionic trophoblast, thus the detection of serum level of β-HCG tends to zero[9].

Serum CA125 belongs to the tumor marker of ovarian cancer. In the early stage of pregnancy, trophoblast cell degeneration and necrosis can cause the increase of CA125 in peripheral blood to affect progesterone secretion, increase the adverse pregnancy outcomes and ectopic gestation occurrence, and destroy the fallopian tube mucosa, making the CA125 enter into maternal peripheral blood and cause the serum level of CA125 increased significantly[10]. In this study, the levels of CA125 in peripheral blood of patients with ectopic gestation were higher than normal control group, and the serum level of CA125 in the ineffective group was higher than effective group. To analyze its possible reasons: patients with ectopic gestation all have the situations of trophoblast cells degeneration and necrosis and destruction of deciduate cells, resulting in the level of CA125 secreted by trophocyte cells was elevated, so as to increase the level of CA125 in peripheral blood[11].

VEGF has the ability of promoting endotheiosis and vascularization. The deciduous endometrial cell on the peritoneum need to rely on blood supply and maintenance, and newborn blood vessels grown in the endometrium is an important step for the occurrence and progression of EMT. VEGF can increase the vasopermeability to promote the chemotaxis and mitosis of vascular endothelial cell, thus promoting the formation of new blood, and it plays an important role in the promotion of angiogenesis factor currently, and the occurrence and development of ectopic gestation[12]. The results of this study showed that the serum level of VEGF in patients with ectopic gestation was higher than the control group, and the ineffective group was higher than effective group, indicating VEGF can be used as the evaluation index for the occurrence and disease prognosis of ectopic gestation. In addition, the detection area, sensitivity, specificity, positive predictive value, negative predictive value under the ROC curve were greater than single index detection when combined the detection of serum CA125, VEGF, β-HCG. Thus the accuracy and sensitivity in early diagnostic of ectopic gestation can be improved by combining various evaluation indexes.

In conclusion, the detection of serum CA125, VEGF, β-HCG can be used as the evaluation index in early diagnosis and prognosis of ectopic gestation, by combing various indexes detection to improve the clinical diagnosis accuracy for ectopic gestation, and the detection method is simple and fast that worth clinical promotion.
Reference


