

Influencing factors analysis for high intensity focused ultrasound ablation in treatment of uterine fibroids.

Ji Yang, Gang Wei, Shuncang Zhang, Hui Zhang*

Department of Ultrasound, the Fourth Hospital of Xi'an, Xi'an, PR China

Abstract

This study aims to analyse the influencing factors for High Intensity Focused Ultrasound (HIFU) ablation in treatment of uterine fibroids. Fifty-one uterine fibroids patients with 76 uterine fibroids were enrolled in this study. All patients received the HIFU ablation of uterine fibroids. The treatment efficacy was evaluated. The residual rate of ablation was calculated. The influencing factors related to the treatment outcome of HIFU ablation were analysed. Results showed that, in 76 uterine fibroids, 25 (32.9%) cases obtained effective treatment outcome, with residual rate $\geq 50\%$, and 51 (67.1%) cases obtained remarkably effective treatment outcome, with residual rate $< 50\%$. The treatment outcome had significant difference among subserous, submucous and intramural fibroid type ($\chi^2=6.614$, $P=0.037$), among fibroid position of posterior wall, fundus uteri and anterior wall ($\chi^2=11.410$, $P=0.003$), between fibroid size of < 5 cm and ≥ 5 cm ($\chi^2=4.259$, $P=0.039$), and among low, equal and high contrast enhancement ($\chi^2=6.153$, $P=0.046$). The logistic regression analysis showed that, the fibroid position was the independent risk factor of treatment outcome, with odds ratio of 2.545 (1.175-5.513). In conclusion, the fibroid type, fibroid position, fibroid size, and contrast enhancement are significantly related to the outcome of HIFU ablation in treatment of uterine fibroids. The fibroid position is the independent risk factor for treatment outcome.

Keywords: High intensity focused ultrasound, Ablation, Influencing factors, Uterine fibroids.

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Introduction

Uterine fibroids are the most common benign tumors in the reproductive organs of women of childbearing age [1]. Uterine fibroids are often accompanied by menorrhagia, prolonged menstruation, dysmenorrhea, frequent urination, abdominal distension, constipation, infertility and other symptoms, which need the clinical treatment [2]. Surgical resection is the most clinically commonly used method for the treatment of uterine fibroids. However, it is difficult to satisfy the fertility requirement of women of childbearing age [3]. Therefore, more and more people begin to seek new noninvasive treatment methods for this disease. High Intensity Focused Ultrasound (HIFU) ablation is an emerging non-invasive treatment modality for tumors. It has advantage of safety, effectiveness, less adverse reaction, and preservation of organ integrity, and has become a new method for the treatment of uterine fibroids [4-7]. The principle of HIFU ablation of solid tumor is that, the extracorporeal low energy ultrasound is focused in the target tissues in body. The sound energy is converted into heat energy, which instantly generates high temperatures in the focal region (60-100°C), resulting in protein denaturation and coagulative tissue necrosis [8]. At present, there are a large number of clinical studies on HIFU ablation of uterine fibroids [9-11]. The ablation of most uterine fibroids can obtain good outcome, but in uterine fibroids, the

ablation rate is very low. There are many factors in pathological and ultrasound aspects which lead to different treatment outcomes. The present study systematically analysed the influencing factors for HIFU ablation in the treatment of uterine fibroids. The objective was to provide certain reference for the clinical application of HIFU ablation.

Patients and Methods

Patients

Fifty-one uterine fibroids patients with 76 uterine fibroids who were treated with HIFU ablation in The Fourth Hospital of Xi'an from May 2012 to January 2016 were enrolled in this study. The age of patients was 28-60 y old, with the average age of 42.3 ± 5.4 y. The patients presented menorrhagia, prolonged menstruation, dysmenorrhea, frequent urination, abdominal distension and other symptoms. The uterine fibroids were diagnosed according to the clinical symptoms, gynecological examination and ultrasound or Computed Tomography (CT) examination. The inclusion criteria were as follows: i) the patients were diagnosed with uterine fibroids; ii) the patients had given birth, with no requirement of reproduction; iii) the diameter of fibroids was 2-8 cm; iv) the patients had no artificial abortion within 3 months. The exclusion criteria were as follows: i) the clinical symptoms