ORIGINAL RESEARCH

Effect of Acupoint Application of Chinese Medicine Combined with a Hot Compress on Pain of Uterine and Fallopian Tube Contrast Agent in Infertile Women

Huiling Xie, MM; Xiaoyu Zhang, MM; Dan Tian, MM; Donghui Liang, MM; Chunmei He, MM; Huina Mao, MM

ABSTRACT

Objective • To investigate the effects of combining traditional Chinese medicine acupoint sticking with sea salt hot compress on pain relief and promoting physical and mental comfort in infertile women undergoing Hysterosalpingo contrast sonography (HyCoSy).

Methods • Infertile women admitted to Zhujiang Hospital of Southern Medical University from October 2021 to December 2022 were selected and 150 of them were selected by random number table method as the main subjects of the study and divided into three groups. The control group received psychological soothing and music therapy. The hot compress group received a sea salt package hot compress at temperatures of 50-65℃ in addition to psychological and music soothing. The combined group received an acupoint application of traditional Chinese medicine along with the hot compress and psychological soothing. Pain levels, assessed using the Numeric Rating Scale (NRS), were recorded at different stages of the HyCoSy procedure: cervical dilatation (T0), balloon intubation (T1), contrast medium injection (T2), 10 minutes after examination (T3), 30 minutes after examination (T4), 24 hours after examination (T5), 48 hours after examination (T6), and 1 week after examination (T7).Stacey salpingography adverse reaction grading method: Adverse reactions were evaluated using the grading method for adverse reactions in salpingography designed by Stacey, and adverse reactions were classified into 0 to 4 levels. Stacey grading was used to evaluate pain severity, and adverse reactions of the vagus nerve, anxiety status, and test comfort were also compared among the three groups.

Results • Statistically significant differences in NRS scores were observed among the three groups of patients at various stages of the HyCoSy procedure (T0-T5) (P = .001, P = .001, P = .001, P = .001, P = .012,). The combined group showed a higher proportion of grade 1-2 pain (96%) compared to the control group (83%) and the hot compress group (90%), while the proportion of grade 3 pain (4%) was lower than that in the control group (17%) and the hot compress group (10%) (P < .001). There were no significant differences in anxiety scores before and 1 week after examination (P= .273, P = 1.000, P = .779). The Kolcaba comfort scores were significantly higher in the combined group (67.54±7.58) and the hot compress group (65.02±8.12) compared to the control group (58.96±7.53) (P < .001,). No complications, scalds, or severe skin allergies were reported in any of the three groups during the one-week follow-up.

Conclusions • The combination of acupoint application with hot compress during HyCoSy resulted in reduced pain levels and improved physical and mental comfort in infertile women. This simple and safe approach can be effectively utilized in clinical practice to enhance the patient experience during the procedure. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

The prevalence of infertility among couples of childbearing ages in China is approximately 25%,[1] with tubal infertility accounting for approximately 49.47%.[2] Therefore, a safe, effective, and accurate evaluation method for evaluating tubal patency is of great significance for the diagnosis and treatment of female infertility.

Hysterosalpingo contrast sonography (HyCoSy) has gradually become the main imaging screening method for evaluating fallopian tube patency due to its advantages of high diagnostic accuracy, non-radiation, simple operation, safety, and non-trauma.[3] At present, the hospital still uses the method of

non-anesthetic analgesia for HyCoSy,[4] and the incidence of pain is high. A meta-analysis shows that 64.4%~92% of patients with HyCoSy have pain, of which 19.7%~36.0% are moderate pain and 5.6%~13.5% are severe pain.[5] At the same time, many studies have shown that commonly used painkillers (scopolamine and atropine) are ineffective in relieving pain in patients with HyCoSy, but increase the incidence of gastrointestinal adverse reactions.[6-8] Pain stimulation, patients are prone to vagus nerve adverse reactions, serious can lead to shock syncope, at the same time can lead to tubal interstitial or isthmus muscle spastic contraction, affecting the accuracy of diagnosis. Currently, there is a lack of simple, safe, and pain-relieving methods. Acupoint application refers to the use of the principle of transdermal absorption on the surface of the human body, exerting the dual effects of traditional Chinese medicine efficacy and meridian regulation to alleviate pain. It is a safe and stable treatment method.[9] Sea salt hot compress can improve blood circulation, activate blood circulation, promote the absorption of inflammatory factors, regulate and smooth organs, remove dampness and cold, and reduce swelling and pain, Activating blood circulation and removing blood stasis are commonly used in clinic to relieve pain and other uncomfortable symptoms.[10] Based on the continuous summary of clinical experience and expert opinions, this study applied traditional Chinese medicine acupoint application combined with sea salt pack hot compress to HyCoSy women, aiming to alleviate pain, reduce vagal adverse reactions, and promoting comfort intervention.

PATIENTS AND METHODS

Research object

A total of 150 women who underwent a HyCoSy examination at the Obstetrics and Gynecology Clinic of a Class III A Hospital in Guangdong Province from October 2021 to December 2022 were selected. A randomized number grouping method was used to divide into a control group, a hot compress group, and an acupoint application combined with a hot compress group (hereinafter referred to as the "combined group").

Inclusion criteria: (1) Infertile women who undergo HyCoSy examination in gynecological clinics meet HyCoSy indications; (2) Over 18 years old; (3) Clear mind, with normal communication and communication skills; (4) Fill in an informed consent form and volunteer for participation.

Exclusion criteria: (1) Patients with lower abdominal pain before examination; (2) Allergies caused by applying traditional Chinese medicine ingredients and adhesive tapes; (3) Those who have infectious skin diseases or inflammatory ulceration at the hot compress site and the applied acupoints; (4) Serious diseases of the respiratory, circulatory, digestive, urinary, and hematopoietic systems; (5) A history of serious mental illness or other drug and drug abuse addicts.

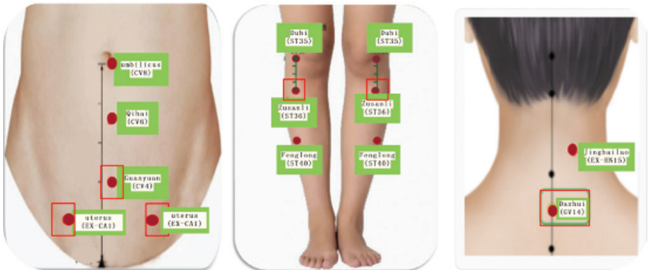
Research methods

Establishment of a research team: The research team consists of 7 people, with specific positions and work contents as shown in Table 1.

Table 1. Research Group Information Sheet

Number	Position	job content
1	Chief Physician of Traditional Chinese Medicine Department	Responsible for program guidance
2	Obstetricians and Gynecologists	Responsible for the inclusion and implementation of research objects
3	Nursing graduate students	Responsible for data collection and statistical analysis
4, 5	Chief nurse in obstetrics and gynecology A, B	Responsible for scheme implementation
6	Nursing Graduate Tutor	Responsible for quality control
7	Acupuncture and moxibustion Doctor of TCM Department	Responsible for training and guidance of traditional Chinese medicine nursing technology

Figure 1. Schematic diagram of acupoint selection



Formulation of application Chinese medicine formula and acupoint selection: The application prescription used in this study is determined by the research team based on discussions about the characteristics of infertile patients and the purpose of the study. Its ingredients mainly include trogopterus dung, cattail pollen, frankincense, myrrh, and corydalis. From Figure 1, we can see that the selected acupoints include bilateral uterus (EX-CA1), Guanyuan (CV4), and bilateral Zusanli (ST36). Sea salt pack hot compress acupoint selection: Qi hai (CV6), Guan Yuan (CV4), uterus (EX-CA1), DaZhui (GV14).

Intervention methods

Intervention methods in the control group: For the control group, nursing measures such as music relaxation and psychological comfort were taken. The specific operation is to keep the examination room clean and tidy, with fresh air, and a temperature of about 25°C. With soothing music playing on the bass, the doctor instructs the patient to use breathing regulation relaxation techniques during the examination, taking five slow and deep breaths each time. At the same time, during the examination, the doctor should strengthen verbal communication with the patient, support and encourage the patient, and distract their attention to alleviate pain.

Intervention methods in the hot compress group: Based on the control group, a hot compress with a sea salt bag was given, and 1500 g of crude sea salt was packed into a non-woven fabric for sealing. The outer side was wrapped in a cotton cloth bag, which was made into a cloth bag with a length of 24 cm and a width of 17 cm, respectively. Ten minutes before the examination, the doctor needs to use a microwave oven to heat two sea salt packs to 50-65°C. Five minutes before the examination, the doctor needs to apply the sea salt packs to the patient's lower abdominal Qihai, Guanyuan, uterine point, and cervical Dazhui point,

respectively, and continue to apply the hot packs until 30 minutes after the examination.

After use, the hot compress bag is sterilized by ultraviolet radiation for 60 minutes to implement the sensory control requirements and prevent cross-infection.

Combined group intervention methods: Based on the hot compress group, traditional Chinese medicine was applied for treatment. First, the doctor needs to take 10 g of Trogopterus Dung, 5 g of Cattail pollen, 10 g of Frankincense, 10 g of Myrrh, and 5 g of Corydalis, mix them with ginger juice to form a paste and prepare the application one hour in advance. The patient should take a supine position 30 minutes before the examination. The doctor needs to clean the skin at the application site, locate and mark the acupoints, and paste them on both uterine points, Guanyuan points, and Zusanli points. After 4-6 hours, the patient can remove the hot compress on their own. During the examination process, the doctor should closely observe the patient's skin condition. If there are symptoms such as skin rash, itching, blistering, etc., the doctor should immediately remove the hot compress and treat it symptomatically.

After the examination, the doctor will give the prepared traditional Chinese medicine application to the patient and let the patient take it home for another 2 days. The method of use is to apply once a day for 4 hours each time.

Evaluation tools

Numerical Rating Scale (NRS): The pain level is represented by 11 numbers from zero to ten. Subjects were given one of the numerical markers based on their personal pain perception. Table 2 shows the evaluation criteria.

Stacey salpingography adverse reaction grading method: Adverse reactions were evaluated using the grading method for adverse reactions in salpingography designed by Stacey,[11] and adverse reactions were classified into 0 to 4 levels. Table 3 shows the classification of adverse reactions.

Self-rating anxiety scale: The SAS scale was used to measure the anxiety level of patients. Using a 1-to-4 point system, add the scores of the 20 questions in the self-test table to obtain a rough score, multiply the rough score by 1.25, and round to the nearest integer to obtain a standard score. The cut-off value for anxiety assessment is 50 points, with 50-60 points being mild anxiety, 60-70 points being moderate anxiety, and greater than 70 points being severe anxiety. The higher the score, the more obvious the anxiety tendency.

Checking comfort: The comfort level was checked using the comfort status scale (GCQ)[12] developed by Kolcaba, an American comfort care expert. Using the Likert Scale scoring method, the higher the score, the more comfortable it is.

Check for vaginal bleeding and complications: The incidence of vaginal bleeding, complications, and adverse events after examination were analyzed.

Statistical analysis

Statistic Package for Social Science (SPSS) version 25.0 software (IBM, Armonk, NY, USA) was used for data processing and analysis.

Table 2. Evaluation criterion

Number	Pain level
0	no pain
1-3	mild pain, acceptable for examination
4-6	moderate pain, difficult to tolerate examination
7-10	severe pain, unbearable pain, and inability to cooperate with the examination

Table 3. Adverse reaction classification

Level	Reaction	Performance
0	no adverse reaction	/
1	mild adverse reactions	mild discomfort and pain, less than or equal to menstrual pain
2	moderate adverse reaction	moderate pain, more severe than menstrual pain, but no vasovagal nerve response
3	severe adverse reactions	the patient has a mild vasovagal reaction (slight nausea, vomiting, pale complexion, sweating), or severe pain that requires observation and treatment in the ward
4	extremely severe adverse reactions	the patient has severe vasovagal nerve response (severe nausea, vomiting, bradycardia, syncope) or severe pain that requires medication or hospitalization, or even cardiopulmonary resuscitation

Table 4. Comparison of general data of patients before intervention ($\bar{x} \pm s$, cases)

General data	Groups	n	($\bar{x} \pm s$)/ (case)	Statistical value	*P* value
age	Control group	48	29.813.37	*F*=1.779	.173
	Hot compress group	50	28.40 ±3.85		
	Combined group	50	29.444.26		
Pregnancy history	Control group	48	0.33±0.52	*F*=0.045	.956
	Hot compress group	50	0.36±0.48		
	Combined group	50	0.34±0.52		
Delivery history	Control group	48	0.06±0.24	*F*=0.128	.880
	Hot compress group	50	0.04±0.20		
	Combined group	50	0.06±0.24		
History of uterine cavity surgery (cases)	Control group	48	14	χ^2=0.266	.875
	Hot compress group	50	16		
	Combined group	50	17		
Pelvic surgery history (cases)	Control group	48	6	χ^2=0.382	.826
	Hot compress group	50	7		
	Combined group	50	5		
History of Pelvic Inflammation (Cases)	Control group	48	5	χ^2=0.296	.862
	Hot compress group	50	7		
	Combined group	50	6		
Dysmenorrhea (cases)	Control group	48	32	χ^2=0.489	.783
	Hot compress group	50	31		
	Combined group	50	30		
Dysmenorrhea score	Control group	48	2.33±2.06	*F*=0.085	.919
	Hot compress group	50	2.18±1.91		
	Combined group	50	2.20±2.02		

Table 5. Comparison of pain scores (NRS) at each time point among the three groups ($\bar{x} \pm s$)

Time	Control group (n=48)	Hot compress group (n=50)	Combined group (n=50)	*F*	*P* value
During cervical dilatation (T_0)	5.08±0.68	4.76±0.66	4.52±0.76	7.84	.001
During balloon intubation (T_1)	5.33±0.60	5.00±0.73	4.84±0.68	6.723	.001
During contrast agent injection (T_2)	5.31±0.48	5.01±0.76	4.81±0.59	7.986	.001
10 min after inspection (T_3)	3.08±0.68	2.82±0.63	2.60±0.73	6.087	.001
30 min after inspection (T_4)	2.08±0.68	1.84±0.65	1.56±0.73	7.026	.001
24 hours after inspection (T_5)	0.79±0.71	0.70±0.58	0.42±0.61	4.562	.012
48 hours after inspection (T_6)	0.19±0.39	0.18±0.39	0.06±0.24	2.159	.119
154 hours after inspection (T_7)	0.06±0.24	0.00±0.00	0.00±0.00	0.031	.969

RESULTS

Comparison of general data

Two cases in the control group did not complete the examination, 48 cases in the final control group, 50 cases in the hot compress group, and 50 cases in the combined group were included in the statistical analysis. The difference in baseline data among the three groups is not significant ($P > .05$), indicating that the baseline data of patients in each group was balanced and comparable, as shown in Table 4.

Table 6. Comparison of adverse reaction grades of Stacey salpingography among three groups (cases/%)

Groups	n	Level 0	Level 1	Level 2	Level 3	Level 4	*H*	*P* value
Control group	48	0	1(2.1)	39(81.2)	8(16.7)	0	6.237	<.05
Hot compress group	50	0	4(8.0)	41(82.0)	5(10.0)	0		
Combined group	50	0	5(10.0)	43(86.0)	2(4.0)	0		

Table 7. Comparison of the incidence of anxiety among the three groups (cases/%)

Groups	n	Cases / (%)		χ^2	*P* value
		1 hour before inspection	1 week after inspection		
Control group	48	6 (12.5)	10 (20.8)	1.200	.273
Hot compress group	50	10 (20)	10 (20)	0.000	1.000
Combined group	50	7 (14)	8 (16)	0.078	.779
χ^2		1.186	0.553		
P value		.430	.806		

Table 8. Comparison of Kolcaba Comfort rating among the three groups ($\bar{x} \pm s$)

Groups	n	Kolcaba Comfort rating	*F*	*P* value
Control group	48	58.96±7.53		
Hot compress group	50	65.02±8.12	15.776	<.001
Combined group	50	67.54±7.58		

Table 9. Comparison of vaginal bleeding among the three groups ($\bar{x} \pm s$ /cases)

Data	Groups	n	$\bar{x} \pm s$/ (cases)	Statistical value	*P* value
Vaginal bleeding (case%)	Control group	48	43		
	Hot compress group	50	45	χ^2=5.140	>.05
	Combined group	50	46		
Stop time of vaginal bleeding (h)	Control group	48	54.50±18.87		
	Hot compress group	50	50.19±20.57	*F*=5.326	<.05
	Combined group	50	41.78±19.49		

Comparison of pain scores at different time nodes

As can be seen from Table 5, the pain score during balloon intubation is the highest, followed by contrast agent injection in the three groups. Through the analysis of variance of sampling and repeated measurements, there is a statistically significant difference in the NRS scores of the three groups at the T0-T5 time point ($P < .05$). At the same time, there is no significant difference in pain scores at the T6-T7 time point ($P > .05$).

Comparison of adverse reaction grading methods for Stacey salpingography

Table 6 shows a comparison of the severity of adverse reactions. The comparative differences between the three groups are statistically significant, while the differences between the control group and the combination group are statistically significant ($P < .05$), indicating that the combination group can effectively reduce the severity of adverse reactions.

According to Stacey's grading criteria, patients with a level above 3 represent symptoms of vasovagal nerve response. Statistical data were used to calculate the incidence of adverse vagal nerve response. It can be found that the incidence rates of the control group, the hot compress group, and the combination group are 17% (8/48), 10% (5/50), and 4% (2/50), respectively. The incidence of adverse reactions is positively correlated with the intensity of pain. The lower the intensity of pain, the lower the incidence of adverse reactions. There is a statistically significant difference in the incidence of adverse vagal nerve response among the three groups ($P < .05$).

Comparison of patient anxiety

When the SAS scale score exceeds 50 (≥ 50), it indicates that the patient has different levels of anxiety. The total detection rate of anxiety on the SAS scale before examination is 15.5%, and the total detection rate one week after examination is 18.9%.

Further analysis of the data revealed that 73.9% of patients with anxiety were over 30 years old, and 71.4% of patients had infertility lasting for more than 3 years. The incidence of anxiety was significantly positively correlated with the patient's age and duration of infertility. The incidence of anxiety increases with age and the duration of infertility. As can be seen from Table 7, by using Fisher's exact probability method to analyze the difference in the incidence of anxiety between the three groups before and after the examination, it can be found that there is no statistically significant difference ($P > .05$).

Comparison of comfort during inspection

From Table 8. There is a statistical difference between the three groups ($P < .05$). Further analysis reveals a statistically significant difference between the combined group and the control group ($P < .05$). There is no statistical difference between the hot compress group and the combined group ($P > .05$), indicating that patients in the combined group have a high degree of comfort in the examination.

Comparison of vaginal bleeding, complications, and adverse events

From Table 9, 135 of the 148 patients experienced a small amount of vaginal bleeding after examination, with the amount of bleeding less than the amount of menstruation. There is no significant difference in the incidence of vaginal bleeding among the three groups ($P > .05$), indicating that intervention methods could not increase the probability of bleeding in patients, and most patients' vaginal bleeding disappeared within 3 days. The time taken for vaginal bleeding to stop was shorter in the combined group as compared to the control and hot compress groups. This indicates that traditional Chinese medicine acupoint application is an effective way to shorten the duration of uterine bleeding. There are significant differences between the combination group and the control group, as well as between the combination group and the hot compress group ($P < .05$).

DISCUSSION

An Acupoint application combined with a hot compress can relieve the pain of HyCoSy.

Pain is the most common adverse reaction of HyCoS, and the level of pain in the control group is the same as that of previous studies.[13,14] All patients in this study have the most pain during balloon implantation, which may be caused by the expansion of the catheter balloon to stimulate the nerve fibers of

the cervix, followed by contrast medium injection, the mechanical dilatation of uterine wall is mainly caused by high uterine cavity pressure in patients with fallopian tube obstruction during radiography. Lead to local prostaglandin release and uterine spasm, excessive expansion of the obstructed fallopian tube can stimulate nerve endings to produce visceral pain, and patients have poor tolerance to pain.[15,16] The prescriptions used in this study are trogopterus dung, cattail pollen, frankincense, myrrh, and corydalis. Many modern medical scholars have discussed the mechanism of pain relief of active components of traditional Chinese medicine. Some studies have clarified the analgesic mechanism of frankincense and myrrh.[17] It is clarified that the compatibility of cattail pollen and trogopterus dung can improve the activity of antiplatelet and antithrombin, so the role of these traditional Chinese medicines in relieving pain, promoting blood circulation, and removing blood stasis is more and more recognized.

The research and treatment of pain in traditional Chinese medicine has a long history. Doctors of future generations have reached a basic consensus that the invasion of cold evil is the main cause of physical pain, the blockage of qi and blood movement is the pathogenesis of physical pain, and the epidemic obstruction of qi and blood is the basis of the change of pain. Pain is the surface phenomenon of qi and blood epidemic obstruction. Most of the drugs selected by acupoint application belong to pungent, warm, and fragrant products, which have the effect of opening the table, warming menstruation, promoting qi, and activating blood circulation. The five medicines in the prescription complement each other and have the effects of promoting blood circulation and dispelling blood stasis, dredging collaterals, and relieving pain.[18,19]

According to the theory of meridians and acupoints, acupoints are the converging point of qi and blood, it is the reaction point of the disease and the irritation point of treatment. The uterine acupoint (EX-CA1) is a strange acupoint outside the meridian and the uterus, which is in the center of the pelvis. Its location is closely related to Ren, du, Chong pulse, liver, kidney, and gallbladder meridian, and is a clinical key point for regulating uterine-related diseases. Some studies have found that acupoint application has a good therapeutic effect on excess dysmenorrhea and has a benign regulatory effect on prostaglandin synthesis in patients with primary dysmenorrhea.[20] Guanyuan (CV4) is the intersection point of the Ren Meridian and foot Sanyin Meridian, which can adjust the three Yin Meridians of the liver, spleen, and Kidney, and has the functions of tonifying kidney and essence, invigorating spleen and invigorating deficiency, nourishing liver and purging. The Zusanli acupoint (ST36) is the foot Yangming stomach meridian point, from which the pulse qi of the stomach meridian goes deep into the human body and the stomach viscera. It is one of the important points for human body tonifying and health care. It can be adjusted to tonify the human body, tonify the vital energy, nourish the body, and dispel evil. This study found that patients with tubal obstruction experienced a more painful experience. The compatibility of traditional Chinese medicine selected by acupoint application can promote qi, promote blood circulation and disperse blood stasis, and activate channels and collaterals to relieve pain. According to the Compendium of Materia Medica: "Salt has the effects of detoxification, cooling blood, moistening dryness, relieving pain, relieving itching, vomiting blood, phlegm, menstruation, and so on." Sea salt can dredge the meridians, guide the kidney meridians, activate blood circulation and remove blood stasis, tonify blood circulation and activate blood circulation.[21] Heated sea salt package can make the heat mild and lasting, stronger penetration, promote muscle relaxation, and vascular dilatation, and promote blood circulation, sea salt package in Qihai, Guanyuan, uterine acupoints, through the thermal effect accelerate drug absorption through the skin to better play the dual role of drug efficacy and meridian regulation, warming yang and activating collaterals, dispelling cold and promoting blood stasis, swelling and pain, to reduce the pain of HyCoSy.

Acupoint application combined with a hot compress can effectively reduce the adverse reactions of the vagus nerve in HyCoSy.

The stimulation of severe pain is one of the main factors causing vasovagal nerve reflex, and it is also an important risk point of uterine cavity operation techniques in obstetrics and gynecology clinics.[22] Vagus nerve reflex is excited by various chemical or physical stimuli, causing adverse reactions in various organs. The causes of vagus nerve reflex in patients are as follows: (1) excessive tension and anxiety, patients are full of fear of examination pain, long-term infertility accumulate many negative emotions, resulting in increased release of catecholamines in the body, stimulation of receptors leads to peripheral vasoconstriction, myocardial contractility increases, vagus nerve tension increases, reflex enhances vagus nerve activity. (2) severe pain stimulation, the operation of uterine instruments caused severe pain, and the pain was transmitted to the central nervous system through the peripheral receptors, causing vasovagal nerve excitement, enhancing its reflex, and causing clinical symptoms. In this study, the incidence of vagus nerve adverse reactions in the combined group was 4% (2/50), 10% (5/50) in the hot compress group, and 17% (8/48) in the control group (8 pm 48). There was a significant difference between the combined group and the control group ($P < .05$). The incidence of vagus nerve adverse reactions was positively correlated with the intensity of pain. Music soothing and psychological soothing were given to patients during HyCoSy, and hot compress and acupoint application of traditional Chinese medicine were used to relieve pain. The average pain score in the combined group was lower than that in the control group and hot compress group at each time point. The incidence of vagus nerve adverse reactions in the combined group decreased significantly.

Acupoint application combined with a hot compress can effectively improve the comfort of HyCoSy.

Kolcaba, an American comfort care expert, put forward the concept of comfort care theory (Thonry of Comfortcare)

in 1995,[24] Affected by the traditional concept of fertility, patients with infertility in China are under more and more psychological pressure. Providing comfortable care can reduce the pain experience of patients, which is of great significance to patients with infertility. Although there was no statistical difference in anxiety scores among the three groups, which was mainly related to the fact that the timing of evaluation and intervention measures failed to change the pregnancy outcome, the incidence of anxiety was lower than that of similar population studies.[24,25] The intervention measures taken were non-invasive and safe. without additional burden on patients, the average pain score at each time point in the combination group was lower than that in the hot compress group and the control group. The score of the Kolcaba comfort scale in the combined group was higher than that in the hot compress group and the control group. There was a negative correlation between pain intensity and comfort. The higher the pain intensity, the lower the comfort.

For patients with infertility, traditional Chinese medicine believes that its pathogenesis is mainly kidney deficiency, mostly due to lack of congenital endowment, coupled with acquired loss of support, and injury caused by work and rest, kidney essence deficiency is Chong Ren imbalance, unable to ingest sperm and pregnancy. The clinical investigation found that most of the patients with infertility had partial physique, mainly deficiency.[26] During the examination, the patient takes the lithotomy position and needs to inject contrast agents and normal saline into the uterine cavity. The temperature is relatively low. It is believed in traditional Chinese medicine that the body is invaded by cold and evil qi currently. A hot compress of sea salt can warm and tonify the kidney, and salty can be soft and firm, stasis powder can unobstruct the meridians, and warm the whole-body qi and blood. Using the sea salt package to heat the lower abdomen can play the role of warm and hot cell palace, dispel cold qi, warm yang, and consolidate the kidney, and at the same time heat compress Dazhui acupoint (GV14), which plays the role of warming channels and collaterals and promoting Yang Qi of the human body. This study found that patients are willing to accept the hot compress measures, especially in cold weather, and the feedback comfort of patients is better. Before the implementation of the hot compress program, explore the temperature drop curve of different heating methods, combined with the characteristics of infertility patients and test process, determine the optimal heating mode and timing, ensure the safety of patients, and provide the most comfortable hot compress experience.

Acupoint application combined with a hot compress is safe and effective for the HyCoSy examination.

The results of this study showed that there was no significant difference in the incidence of vaginal bleeding among the three groups. Hot compress and acupoint application of traditional Chinese medicine did not increase the incidence of vaginal bleeding. Cervical dilatation, balloon intubation, and contrast agent injection were needed for the HyCoSy examination. All of the above procedures can damage the endometrium and cause vaginal bleeding. The bleeding time of the control group, hot compress group, and combination group were (54.50 ±18.87) h, (50.19 ±20.57) h, and (41.78 ±19.49) h, respectively ($P < .05$). The vaginal bleeding time of patients in the combined group was shortened, and the traditional Chinese medicine ingredients of the application prescription had the effect of promoting blood circulation and removing blood stasis, relieving menstruation, and relieving pain, which effectively shortened the time of vaginal bleeding. No fever, vaginitis, pelvic inflammation, and other complications occurred in the follow-up patients 7 days after the examination, and no adverse events related to the study occurred during the study period, indicating that acupoint application of traditional Chinese medicine combined with hot compress is safe and effective in HyCoSy.

Summary and limitation of the study

The acupoint application of traditional Chinese medicine composed of trogopterus dung, cattail pollen, frankincense, myrrh, and corydalis combined with acupoints of uterus (EX-CA1), Guanyuan (CV4) and Zusanli (ST36), combined with hot compress of sea salt can effectively relieve the pain of HyCoSy, reduce the incidence of adverse reactions of vagus nerve and improve the comfort of examination. This study also has certain limitations. The feeling of pain in the human body under stress is a comprehensive response that is influenced by multiple factors and can lead to certain psychological biases that affect observation results. The follow-up time of each patient is only 7 days. Only short-term complications can be evaluated. In this study, there is no blind method. The next step is to optimize the design as far as possible to achieve double-blindness, reduce the subjective impact on the test results, and reduce the offset.

CONFLICT OF INTEREST

The authors have no potential conflicts of interest to report relevant to this article.

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AUTHOR CONTRIBUTIONS

HX and HM designed the study and performed the experiments, XZ and TD collected the data, DL and CH analyzed the data, and HX and HM prepared the manuscript. All authors read and approved the final manuscript.

ETHICAL COMPLIANCE

This study was approved by the ethics committee of Zhujiang Hospital, Southern Medical University (Approval no. 2022-KY-124-01). Signed written informed consent was obtained from the patients and/or guardians.

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