Curative effect of lauromacrogol and absolute ethyl alcohol injection guided by ultrasound on simplex hepatic cyst

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Abstract: This research aims to analyze the curative effect and security of lauromacrogol injection and absolute ethyl alcohol treating simplex hepatic cyst respectively. The simplex hepatic cyst patients were divided into lauromacrogol group (86 cases, research group) and absolute ethyl alcohol group (80 cases, control group). Both two groups received sclerotherapy of thoracic drainage under ultrasonic guidance and the curative effect and untoward effect were observed. The result showed there was no hemorrhage or infection within two groups. During the therapeutic process, 45 patients (56.3%) suffered from pain at different degrees and 23 cases were found with symptom of drunkenness in control group, while the patients in the research group were found with no obvious discomfort. A week after treatment, 23 patients (25.0%) in control group still remained to have swelling pain at upper right stomach, while there were only 9 in treatment group (10.5%), and the difference was of statistical significance (X^2=6.037, P<0.05). through 6 months of follow-up visit after the operation, we found the cure rate of lauromacrogol group was 94.6% and absolute ethyl alcohol was 92.6%, and the difference between these two groups was of no statistical significance (P>0.05). The results showed that, in the treatment of cystosclerosis with absolute ethyl alcohol injection under ultrasonic guidance, some patients suffered pain and the symptom of drunkenness at different degrees, whereas, lauromacrogol was effective with no untoward effects, therefore it is worthy of clinical popularization and application.

Keywords: lauromacrogol; absolute ethyl alcohol; hepatic cyst; sclerotherapy

INTRODUCTION

Simplex hepatic cyst is a common hepatic benign disease, which is mostly congenital. As the cyst grows slowly, most patients have no obvious symptom at the early stage and do not know it until receiving physical examination accidentally. But, at late stage, huge hepatic cyst brings distinct pressure symptom. If involving co-infection, the patients may suffer intolerance of cold, fever, stomachache and some other symptom, which is hepatic cyst alike. The research of Moschcowitz on fetus hepatic cyst in 1906 found there were ectopic bile duct tissue and rectangle epithelial cell on cyst wall. Since then, the occurrence of hepatic cyst has been ascribed to ectopic bile duct. Modern medical field tends to believe that hepatic cyst is caused by the endocrine retention of lumen because of the development disorder of intrahepatic vagus bile duct at embryonic period and local lymphatic block results from inflammatory epithelium hyperplasia (Jianmin *et al.*, 2010).

As to the therapeutic method, though the traditional therapy opening of hepatic cyst has certain curative effect, it has been gradually abandoned due to the long time of operating, severe hemorrhage during operation, slow postoperative recovery and long time of stay etc. The later appeared absolute ethyl alcohol sclerotherapy is effective for SHC and is applied as the first choice of therapeutic schedule at the early period (Linxue *et al.*, 2007). But after receiving absolute ethyl alcohol sclerotherapy, many patients suffer several kinds of untoward effects such as pain at upper right stomach and drunkenness reaction; especially to the patients whose cyst is nearby the envelope, They may suffer from sharp pain due to the overflow of ethyl alcohol from envelope during washing by absolute ethyl alcohol in puncture treatment, thereby further affecting treatment and inducing long-time discomfort on upper right stomach. For now, percutaneous hepatic cyst puncture infusion with hardener guided by ultrasound has taken the place of traditional surgery and become the first chosen treatment means. It focuses on the treatment of percutaneous thoracic drainage using absolute ethyl alcohol as the hardener; though the commonly used hardener such as medical absolute ethyl alcohol is cheap and has definite effect, the occurrence rate of untoward effect is high and the recurrence rate exists (Weibing *et al.*, 2014).

This research applied new type of hardener, lauromacrogol injection, in the treatment, observed its effect and untoward effect and compared it with medical absolute ethyl alcohol. The research result is reported as below.

MATERIALS AND METHODS

Materials

Clinical materials

A total of 166 patients who were hospitalized in the affiliated hospital of Shandong Medical University in

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China and diagnosed as SHC from March 2011 to February 2014 were selected and treated with percutaneous hepatic cyst puncture infusion with hardener guided by ultrasound. There were 86 cases who were treated with lauromacrogol in research group, among which 39 were male and 47 female, ranging in age from 25 to 71 years(mean (49±16 years) ; there were 80 cases of single cyst and 6 cases of multiple cysts, of which the maximum diameter ranged from 4.1cm to 8.7cm, mean (5.2±2.6)cm. There were 80 cases who were treated with absolute ethyl alcohol, among which 42 were male and 36 female, ranging in age from 28 to 76 years (mean 48±15 years); and there were 72 cases of single cyst and 8 cases of multiple cysts, of which the maximum diameter ranged from 4.5cm to 9.4cm, mean (5.8±2.5) cm. The basic material of both groups was of no statistical significance (P>0.05).

Apparatus

The Parkson Mylab90/siemens 52000 color Doppler ultrasound diagnostic apparatus with detector of 3.5-5.5MHz and PTC puncture needle of 18-21G were applied. Lauromacrogol injection (Shanxi Dayu Pharmacy) and 99.8% medical absolute ethyl alcohol were chosen as the hardener.

Methods

Hardener injection

All the patients received examination for blood routine and coagulation function before the operation and signed the informed consent of special treatment with ultrasound intervention. The location, quantity and size of the cyst was detected and figured out by color Doppler ultrasound. After conventional skin disinfection, we prepared to pave the drape and local anesthesia using 2% lidocaine; then we chose the best method to insert needle and insert the needle to the deep center of cyst cavity, pull out the stylet and extract the liquid to empty using 30ml injector. We injected research group with lauromacrogol according to the size of the cyst and the cyst liquid volume extracted, the amount of injection was 1/3-1/2 of the volume; assure the uniform distribution of the injection and extracted and flushed it for 5 minutes, then extract out; again inject the cyst with less than 30ml lauromacrogol and reserve; after the operation, the patients were reminded to turn over frequently to make the hardener sufficiently touch the capsule wall. As to control group, after the extraction we flushed the cyst with 0.9% NaCl solution, then inject absolute ethyl alcohol 1/4-1/3 the amount of cyst liquid; reserve for 3 to 5 minutes then extracted all the absolute ethyl alcohol; repeated for the 2 to 3 times as the same way and pull out the PTC needle. We observed for 2-3h after the operation, the patients who were aged, with bad physical condition or with terrible reaction should be hospitalized for observation. Observe closely if anhelation, fever or pain etc occurred to any of the patients; take antihistamine orally if mild anaphylaxis such as skin itch, erythema etc occurs; apply intravenous drip or intramuscular injection of 5-10mg dexamethasone if the patients suffered arrhythmia, shock and some other severe complication. Conventional anti-inflammatory drug was taken orally for 2 to 3 days to prevent infection. Conventional ultrasound was applied to reexamine if there was any sign of hemorrhage or obvious clinical discomfort. If not, there is no anaphylaxis and the outpatients could go home directly and the inpatients could be sending to their ward and then observed postoperative reaction.

Post-operation follow-up

Follow-up visit all the patients a week later since the operation and reexamine the color Doppler ultrasound 3 and 6 months later since the operation. The maximum diameter of the cyst was measured and compared with pre-operation. Complete disappearance of cyst or cyst cavity was confirmed as cure, 50% reduction of maximum diameter of the cyst was confirmed as effective, and the rest as void.

STATISTICAL ANALYSIS

The statistic analysis was performed using SPSS19.0 software. Measurement data was expressed as x±s; comparisons between groups were calculated with t-test; enumeration data was tested using X^2. All results were considered statistically significant as P<0.05.

RESULTS

Statistic results

There was no hemorrhage, infection or other complications occurring in both groups. Among control group, there were 45 cases who suffered pain of different degree and 23 cases suffered symptom of drunkenness during the treatment; among research group, there was 11 cases who suffered pain of different degree, symptom of drunkenness and no obvious discomfort occurred. A week later since the treatment, there were 20 patients who suffered swelling pain at upper right stomach among control group, whereas only 9 cases among research group; the difference was of statistic significance (X^2=6.037, P<0.05); through the analysis of 6 months follow-up after the operation, the cure rate of lauromacrogol group and absolute ethyl alcohol group was 94.6% and 92.6% respectively, of which the difference was of no statistic significance (P>0.05). The result is shown in table 1.

Therapeutic effect evaluation

The cyst operation of both groups succeeded within one puncture. The quantity of cyst liquid extracted was 40-145ml, mean (92±35) m1. Six months later since the treatment, 87 cases (94.6%) were cured and 5 cases (5.4%) were with obvious effect among treatment group,

Table 1: Statistical table of clinical symptoms in experimental group and control group

Name	Pain (case)	Drunkenness (case)	Pain a week later since the operation (case)	Effective rate	Cure rate
Research group	11	0	9	100	94.6%
Control group	45	23	20	100	92.6%

the total efficiency was 100%. As to control group, 80 cases (92.6%) were cured, 7 (7.4%) were with obvious effect and the total efficiency was 100%. The comparison of cure rate between two groups was of no statistic significance (P>0.05). The therapeutic effect is shown in fig. 1.

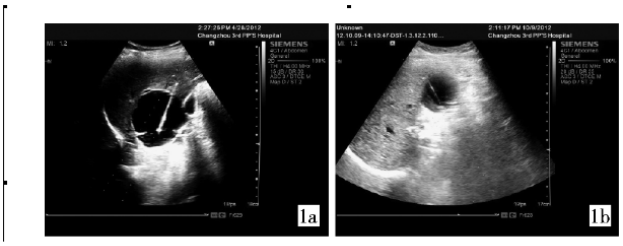

Fig. 1: ultrasonic images of hepatic cyst treatment using two hardeners.

1a lauromacrogol sclerotherapy of thoracic drainage under ultrasonic guidance

1b ethyl alcohol sclerotherapy of thoracic drainage under ultrasonic guidance

Analysis of untoward effects

No severe untoward effect such as hemorrhage and infection occurred in both groups. There was no obvious discomfort in the research group during the treatment and only 9 patients (10.5%) suffered mild swelling pain at the upper right stomach during the random visit a week after the treatment. As to control group, 45 patients (56.3%) suffered pain of different degree during the treatment and 23 cases (28.8%) suffered the symptom of drunkenness such as flushing, heartbeat expediting, thirst and nausea etc. Randomly visit the patients a week after the treatment and we found 20 patients (25%) suffered swelling pain at the right upper stomach. The comparison with research was of statistic significance (X^2=6.073, P<0.05).

DISCUSSIONS

Featured by minimally invasion, simple operation and low price, hepatic cyst puncture infusion with hardener guided by ultrasound has been widely applied clinically. The therapy works upon aseptic inflammatory reaction, necrosis and secretion function loss of epithelial cell of cyst inner wall as well as adhesion, organization and occlusion of cyst cavity (Jibin 2004). Traditional hardener includes tetracycline injection, sodium morrhuate and absolute ethyl alcohol etc (Kilinc *et al.,* 2008; Fanzhe *et al.,* 2012) among which absolute ethyl alcohol is more effective and has been widely applied in clinic. The key of absolute ethyl alcohol treatment is to make sure the drug concentration is high enough. As the residual cyst fluid of conventional extraction reduces the concentration of absolute ethyl alcohol, which affects the curative effect, several repeated flushing is in demand in cyst sclerotherapy. Some patients cannot stand the local stimulus reaction of absolute ethyl alcohol injection and suffer the symptom of drunkenness such as flushing, palpitation and dizziness etc, which restrict the application value to some degree.

The scientific name of lauromacrogol is Polyoxyethylene 10 lauryl ether which is a new type of detergent blood vessel hardener and commonly applied in sclerotherapy of varicose vein such as varicose vein of lower limb and esophageal and gastric varices etc; the mechanism of treating cyst of liver and kidney is destroying endothelial cells of capsule wall which occurs aseptic inflammation, thus endothelial tissue atrophies and cyst cavity adheres and occludes; meanwhile it has the function of relieving pain, constriction and diminishing inflammation (Yanqiao *et al.,* 2013). The curative of lauromacrogol in renal cyst sclerotherapy is clear, and the untoward effect is less than the traditional absolute ethyl alcohol sclerotherapy, but there are few reports on lauromacrogol sclerotherapy treating simplex renal cyst. Besides, lauromacrogol can be applied in sclerotherapy of myoma of uterus, pancreatic pseudocysts and shell cystic lesion (Jun *et al.,* 2012). As the first choice of endovascular hardener, lauromacrogol has been widely applied in sclerotherapy of all kinds of hemangioma, venous malformations, varicosity and cyst disease in European and American countries. The security has been affirmed and it has been clinical applied since 2008. This research showed that both lauromacrogol and absolute ethyl alcohol have high cure rate in the treatment of hepatic cyst and the difference was of statistic significance. But the occurrence rate of untoward effect of absolute ethyl alcohol group during the treatment and after the operation was much higher than lauromacrogol group, which focused on local pain and was consistent with the literature and report (Songyuan 2011; Guobing *et al.,* 2013). The reason could be that absolute ethyl alcohol leaks along with the needle passage and stimulates the hepatic capsule; some patients suffered the symptom of drunkenness after absolute ethyl alcohol injection such as chest distress, palpitation, dizziness and flushed face etc; what's more, as the protein level in cyst fluid is high, the injected absolute ethyl alcohol make the protein clot rapidly which may jam the needle passage, prevent ethyl alcohol form extracting out and restrict the curative effect.

This research suggested that, the puncture injection of lauromacrogol in sclerotherapy has no irritation, no severe pain and no drunkenness reaction and it can be left and keep in body without many times of flushing. After 6 months follow-up, we found the curative effect was satisfactory.

CONCLUSIONS

In a word, as a new hardener, cinnamyl is effective in hepatic cyst sclerotherapy, brings slight untoward effect and is worthy of clinical popularization and application. But, for now, the high price compared with absolute ethyl alcohol restricted its clinical application and the long-term curative effect and untoward effect needs further research.

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