

# Observation for clinical effect of phellodendron wet compress in treating the phlebitis caused by infusion

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**Abstract:** Aim of the study was to observe and analyze the clinical effect of phellodendron wet compress in treating the phlebitis caused by infusion. The research objects were 600 cases of phlebitis caused by infusion, all of which were treated in our hospital from June 2013 to June 2016. All patients were entitled to the right to know. They were randomly divided into the research group and the control group. Patients in the control group were treated with magnesium sulfate solution wet compress, while patients in the research group were treated with phellodendron wet compress. The effects in these two groups were observed and compared. Compared with the control group, the research group has better overall treatment efficiency,  $p < 0.05$ ; shorter average onset of action,  $p < 0.05$ ; less time in relieving red swelling and pain,  $p < 0.05$ . Phellodendron wet compress shows a beneficial effect in treating the phlebitis caused by infusion. It can not only obviously shorten the onset of action, but also level up the overall treatment efficiency that helps patients to recover.

**Keywords:** Phellodendron wet compress, infusion, phlebitis, clinical effect, comparative observation.

## INTRODUCTION

Phlebitis is one of the most common complications during the clinical infusion. Phlebitis is caused by many factors like high infusion concentration and high irritable drugs (Cirak *et al.*, 2015; Abdel *et al.* 2016), that lead to chemical inflammatory reaction on the local venous wall. Besides, if not strictly following the aseptic operation during infusion, local venous infection may still occur (Chen *et al.*, 2012; Damyanov *et al.*, 2015). Venous indwelling needle may cause different extents of mechanical injury on local venous wall. The movement of indwelling needle cannula inside the blood vessel would impact and even cause necrosis in vascular. Repeated intima injuries can cause vein atrophy or diminution (Qin, 2012; Zhang *et al.*, 2013).

Phlebitis caused by infusion is because of irritancy by various factors produced on the inner wall of blood vessel (Zhao *et al.*, 2013), which may cause many clinical manifestations, including local red swelling, streak, or different extents of pain and even induration in vein (Wroblewska *et al.*, 2015; Cui, 2016). Fig. 1 shows the symptomatic grading. Apart from the pain added on primary disease, phlebitis causes some difficulty in continued treatment and re-puncture. If not timely or properly handled, the fester, necrosis, infection or even septicemia may occurs in local skin tissue (fig. 2), which would not only increase treatment costs, but also arouse the medical dispute (Chen *et al.*, 2014; Hazra, 2015).

To probe into the optimal treatment method for phlebitis caused by infusion to relieve the pain of patients and help

them recover as soon as possible, this paper analyzed and explored the treatment effect of phellodendron wet compress, whose detailed report is shown below.

## MATERIALS AND METHODS

### General information

We selected 600 cases of phlebitis caused by infusion, of which were treated from June 2013 to June 2016. All cases had met the provisions in INS (Insulin) and their phlebitis extents were diagnosed without sensory disability, coma, and death. All patients were approved by Ethics Committee of our hospital, ethical approval number as No.2016HUCMD2 and all patients signed on the informed consent. Under such circumstances, 600 cases were randomly divided into the research group and the control group, which had 300 cases. In the research group, there were 162 males and 138 females aged 22-80 ( $49.7 \pm 2.8$ ); in the control group, there were 158 males and 142 females aged 20-78 ( $48.6 \pm 2.4$ ). By comparison of related information of patients in the research group and control group, the result has comparability and  $p > 0.05$ .

### Method

Steps of treating patients in the control group with magnesium sulfate solution wet compress are as follows. We added distilled water (100mL) in magnesium sulfate powder (50g) to obtain the magnesium sulfate solution in 50% concentration after full dissolution; processed it within 10 min as soon as the phlebitis (fig. 4) occurred; thoroughly flushed the lesion region with normal saline and infiltrated the sterile gauze with magnesium sulfate solution in 50% concentration, put it on the affected part in wet state exceeding about 2cm of the red swelling region and wrapped with plastic wrap for replacement

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every 2 hours lifted and immobilized the swollen limb until the pain of affected part completely disappeared and observed for 2 days.

Steps of treating patients in the research group with phellodendron wet compress are as follows. We added phellodendron (10g) in distilled water (100mL) to obtain the phellodendron aqueous solution after full dissolution with drugs made when necessary; after the phlebitis appeared, carefully flushed the lesion region like that in control group and infiltrated the sterile gauze with phellodendron aqueous solution to know that no dripping occurred; put it on the affected part in wet state exceeding about 2cm of the red swelling region and wrapped with plastic wrap for replacement every 2 hours; lifted and immobilized the swollen limb until the edema and pain of affected part completely disappeared and observed for 2 days.

#### Observation target

Treatment improvements of symptoms including local vein, surrounding red swelling and heat pain were observed. The regression of swelling is based on whether the color and elasticity of local skin region are like those of surrounding skin regions. The evaluation of the pains was performed with the visual simulation method. Below is the evaluation method of overall treatment efficiency: markedly effective: within 12h after treatment, local swelling regressed, pain greatly relieved, sense of hotness disappeared, skin shriveled up and skin elasticity recovered; effective: 12-24h after treatment, edema disappeared, pain greatly relieved, no sense of hotness, skin shriveled up and skin elasticity recovered; ineffective: all the above were not improved 24h after treatment.

### STATISTICAL ANALYSIS

In this paper, measurement data were represented by ( $\pm$ s), enumeration data were represented by (n, %), inter group comparison was performed by t test and chi-square test, and data processing was made with SPSS21.0 statistical software. When  $P < 0.05$ , the difference was statistically significant.

### RESULTS

#### Comparison of average onset of action in the two groups

As shown in table 1, the onset of action of patients in research group is shorter than that in control group after treatment by two different wet compress methods. This was statistically significant,  $P < 0.05$ .

#### Comparison of pain in the two groups

As shown in table 2, the easement time of pain and recession time of red swelling of patients in research group is shorter than that in control group after treatment. This was statistically significant,  $P < 0.05$ .



Fig. 1: Clinical symptomatic grading of phlebitis (Damyantov *et al.*, 2015)



Fig. 2: Septicemia Diagram (Cui, 2016)



Fig. 3: Phlebitis (Cui, 2016)

#### Comparison of overall treatment efficiency in the two groups

As shown in table 3, the overall treatment efficiency of patients in control group is higher than that in research group. This was statistically significant,  $P < 0.05$ .

### DISCUSSION

As per findings available, 21% of peripheral venous infusion patients would suffer different extents of

**Table 1:** Comparison of average onset of action in the two groups (x±s)

Group	Number of cases	Average onset of action (d)
Research group	300	2.52±0.54
Control group	300	5.11±0.62
t		7.35
P		<0.05

**Table 2:** Comparison of pain in the two groups (x±s)

Group	Number of cases	Easement time of pain (h)	Recession time of red swelling (d)
Research group	300	42.3±5.5	72.6±5.8
Control group	300	88.6±6.7	95.8±7.4
t		14.86	15.73
P		<0.05	<0.05

**Table 3:** Comparison of overall treatment efficiency in the two groups [n (%)]

Group	Number of cases	Markedly effective	Effective	Ineffective	Overall treatment efficiency
Research group	300	202 (67.33)	83 (27.67)	15 (5.00)	285 (95.00)
Control group	300	156 (52.00)	86 (28.67)	58 (19.33)	242 (80.67)
X <sup>2</sup>					14.68
P					<0.05

complications (Ofori-Kwakye, 2016). As one of the common complications, phlebitis caused by infusion can extend the length of stay, increase the treatment cost, reduce the satisfaction of patients and even lead to accidents including complaints, indemnity, wounding, and media intervention (Attari, 2016). Phlebitis is mainly divided into four types: bacterial, chemical, mechanical and thrombotic (Yuan *et al.* 2008). Because of this background, nurses should focus more on preventing and controlling the occurrence of phlebitis, commonly including: strictly executing the standard of aseptic operation, properly selecting the vein, increasing inspection and timely handling problems such as intravenous extravasation, mastering infusion skills and new needle withdrawal method, and correctly applying the indwelling needle (Yu *et al.* 2016).

In terms of TCM, phlebitis is subject to “dangerous pulse; joint disease”, whose treatment is out of the pulse with damp-heat symptoms (Abdel *et al.*, 2016). For this reason, TCM treats phlebitis mainly with clearing heat and promoting diuresis, promoting blood circulation to remove blood stasis, reducing swelling and resolving mass, as well as invigorating pulse-beat (Zhang *et al.*, 2007; Cirak *et al.*, 2015). Phellodendron is a genus of deciduous trees (amur cork tree and schneid) without corks in the family Rutaceae (Chen *et al.*, 2012; Damyanov *et al.*, 2015). It contains many elements, including phellodendrine, obaculactone and obacunone, which are bitter in taste and cold-natured. With wide antibacterial spectrum, it can purge fire for removing toxin, clear away heat and dry dampness, bring down the fever and eliminate steam As shown in clinical studies

(Qin, 2012; Zhang *et al.*, 2013), phellodendron can effectively inhibit typhoid, dysentery and pathogenic bacteria such as staphylococcus aureus; fully protect platelets and reduce the capillary permeability (Abdel *et al.* 2016); promote the absorption of subcutaneous exudation when used in topical treatment; ease pain, clear away heat and nourish skin (Chen *et al.*, 2012), thus speeding up the recovery of skin elasticity for detumescence, astringency and promoting granulation.

## CONCLUSION

This paper shows that compared with the control group, the research group using phellodendron wet compress has better overall treatment efficiency, the average onset of action, regression time of red swelling and easement time of pain, P<0.05, so the treatment effect is clear. To sum up, phellodendron wet compress shows a significant effect in treating the phlebitis caused by infusion. It can not only obviously shorten the onset of action of drugs, but also level up the overall treatment efficiency that helps patients to recover. Thus, it is worth to be popularized.

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