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Polycystic Ovary Syndrome
Literature Review

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Polycystic ovary syndrome

Definition “persistent anovulation with a spectrum of etiologies and clinical manifestations (McCance & Heuther, 1998, p752).

Introduction

This literature review will discuss the diagnosis and treatment strategies for polycystic ovary syndrome (PCOS), from both a Western medical (WM) perspective and traditional Chinese medicine (TCM) perspective. Current trends in research into the use of Chinese herbs and formula will be reviewed, as well as of combined TCM and WM approaches.

Officially given the name Stein-Leventhal syndrome in 1935, named after the authors who published the work ‘Amenorrhea associated with bilateral polycystic Ovarie’ (Lobo & Carmina, 2000). It has since become known as Polycystic ovary syndrome (PCOS) and is a condition that affects approximately 7-10% of the female population worldwide (Dasgupta & Reddy, 2008).

Diagnosis

Western

The original criteria used for diagnosis was pathognomonic ovarian findings along with the presence of hirsuitism, obesity and amenorrhea (Lobo & Carmina, 2000). The advent of modern clinical investigative equipment has subsequently expanded the required diagnostic criteria, though there is still some disagreement over which signs and symptoms have to be present in order to arrive at a firm diagnosis. The luteinizing hormone (LH)/follicle stimulating hormone (FSH) ratio has been used historically to help confirm diagnosis, however later research has found this to be of limited effectiveness (Cho *et al.,* 2006). Ertorer *et al.*, (2007), found the commonly used Rotterdam 2003 criteria, to be insufficient in many cases, failing to identify subjects who were later found upon clinical examination to be positive for PCOS. Azziz (2006) not only found the Rotterdam 2003 criteria to be insufficient, but also found the same of the earlier diagnostic criteria used, that of the National Institutes of Health (NIH) 1990. In the comparison of the two formats conducted by Hsu *et al.,* (2007), it was found that the NIH criteria only picked up the more severe symptoms, whereas the Rotterdam 2003 criteria picked up those with less severe symptoms, though flaws were still identified. The latest set of criteria used for identification of PCOS is that proposed by the Androgen Excess Society (AES). Called the AES diagnostic criteria, this takes into account the other aforementioned criteria and incorporates certain modifications in response to criticism of the previous two systems (see appendix 1 for comparisons and details)

In summary, the AES 2006 criteria recommends the following in order to diagnose PCOS:

Diagnositc criteria:

The presence of hyperandrogenism, clinical or biochemical, and either:

1. Oligo-anovulation or
2. Polycystic ovary morphology

Clinical traits:

1. Free androgen index or free testosterone
2. total testosterone
3. DHEA
4. Androstenedione

At least one ovary showing either twelve or more follicles (2-9mm diameter), or ovarian volume of 10ml.

PCOS is thought to be related to hyperinsulinemia, which in turn is thought to cause the hyperandrogenism (Meletis & Zabriskie, 2006).

Chinese Diagnosis

A review of text books written by three popular western TCM authors reveal similarities and differences of approach. Maciocia (1998) states that the following syndromes are common in PCOS:

1. Deficiency of Kidney yang with Dampness/Phlegm
2. Deficiency of Kidney yang, with Phlegm and Stasis of Blood

Flaws (2005) suggests that the possible syndromes are:

1. Spleen & Kidney yang qi deficiency with qi and Phlegm obstruction (2005)
2. Phlegm Dampness Obstruction & Stagnation

The pattern differentiation is not quite as clear in Flaws, as he mainly discusses presenting signs and symptoms from a TCM perspective, rather than discussing the 'Western' diagnosis. A good example of this is the chapter on 'blocked menstruation' which does not refer to PCOS at all yet some of the case studies cited in this chapter do. There is some evidence though that Flaws has since reviewed this approach and has recently stated that the main patterns that he has found to be associated with PCOS based on his clinical practice are:

1. Kidney Vacuity
2. Spleen Vacuity
3. Liver Depression
4. Depressive Heat/Fire Effulgence
5. Phlegm Dampness
6. Blood stasis

(Flaws, 2007)

Lyttleton (2004), also identifies, Phlegm Damp accumulation and Kidney yang deficiency as a possible pattern, but goes on to state that many of those with PCOS now investigated using the wider index (see AES 2006, above) would show few (if any) signs of this pattern, and that in these cases a pattern of Kidney yin deficiency (either congenital or arising from qi Stagnation, or qi and Blood deficiency) may be more apparent. Lyttleton tends to use Western medicine investigative procedures to help inform diagnosis and in the case of PCOS she refers to using LH and FSH ratios as a guide. She believes that a ratio of LH to FSH greater than 2.5 suggests Kidney yang deficiency and Phlegm-Damp accumulation; whilst with a ratio of less than 2, Kidney yin deficiency is suspected. An extensive search has not revealed any research to substantiate this approach, so one must assume that this is based upon her own clinical experience.

Research papers

A review of research papers reveals that a variety of TCM patterns are associated with PCOS.

A review of the work of four authors by Shi-Ping (2006) (cited in Flaws, 2007) identifies the patterns of:

1. Qi stagnation & Blood stasis
2. Phlegm Dampness internally obstructing

3. Liver Blood-Kidney yin and yang vacuity pattern.
4. Kidney vacuity with Phlegm Dampness
5. Liver-Kidney yin vacuity
6. Qi depression with Phlegm Dampness
7. Liver fire depression & binding
8. Kidney vacuity with Phlegm repletion
9. Kidney vacuity with Liver depression
10. Kidney yin vacuity with Phlegm repletion & Blood stasis
11. Kidney vacuity with Blood stasis

Treatment

Conventional

One of the first drugs to be used to help induce ovulation in those with PCOS was clomiphene citrate (CC) (Palomba *et al.*, 2005) though Metformin is now the most commonly used western pharmaceutical (Seli & Duleba, 2004), possibly due to the fact that it has been shown to be more effective than CC. The original rationale behind Metformin use was that many who have PCOS also have insulin resistance and compensatory hyperinsulinemia. Metformin has been shown to lead to a decrease in serum insulin and androgen levels, and improvement in ovulatory function (Seli & Duleba, 2004). Baillargeon *et al*.,(2004) however, found that even in non-obese PCOS sufferers who had normal insulin sensitivity,

metformin was still able to increase ovulatory frequency and lower androgen levels.

Oriental

Treatment will is usually based around Bianzheng patterns, however Kampo formulae seem to be trialed on a wide variety of pathologies just to see what affect they may have, rather than using a diagnosis as the rationale.

The afore-mentioned textbooks refer to the use of a variety of formulas. Both Maciocia (1998) and Flaws (2005) refer to the work of Master Yu Huang and recommend his formula Yu Shu Wen Bu Fang. This formula is based upon the principle of tonifying Kidney essence and Kidney yang, resolving Phlegm and softening masses (see appendix 2, table 1)

Maciocia (1998) also uses a four stage approach referred to as 'Zhong Yao Ren Gong Tiao Qi Zu Fang' (Chinese formula to regulate the menstrual cycle artificially) (p.810-811). It is composed of four groups of formulae two within each group for yin or yang deficiency. Each group is taken for seven days in the absence of periods in order to establish a menstrual cycle artificially. The same approach and formula is cited again by Flaws (1998) and accredited to Master Yu Huang. Flaws states that the study involved 27 women, all of whom ovulated after three months, with 24 conceiving within three years (a claimed success rate

of 88.8%). These formulas use numerous herbs, however none of the formulas address Phlegm Dampness, despite this being one of the main patterns identified in their text books.

Flaws (2005) cites abstracts from various research papers written in China, however the original papers are written in Chinese and therefore a critique is not possible by this author.

In the category of Phlegm Dampness obstruction and stagnation, Flaws (2005), Maciocia (1998) and Lyttleton (2004) recommend the formula Cang Fu Dao Tan Wan (see appendix 2, table 2), which contains herbs to resolve Phlegm and Damp, move stagnant qi and promote digestion, and Lyttleton states it is also good for clearing blocked fallopian tubes. Interestingly it is only Lyttleton (2004) that lists all the herbs commonly found in the formula (as listed above). Maciocia (1989) omits cang zhu *(Rhizoma Atractylodis)*, and Flaws omits fu ling *(Sclerotium Poriae Cocos)* from their list of herbs.

Lytleton's recommendation for treating Phlegm-Damp obstruction with Kidney deficiency is a modification of Gui Shao Di Huang Tang, which itself is an adaptation of Liu Wei Di Huang Wan. (see appendix 1, table 3). To this traditional formula Lyttleton adds: Tu Si Zi, 10g (Semen Cuscutae Chinensis), Du Zhong, 5g (Cortex Eucommiae Ulmoidis), and Sha Ren, 5g (Fructus Amomi).

Lyttleton also suggests the formula Xiong Gui Ping Wei San to clear Phlegm Damp by supporting the Spleen and Stomach with Damp clearing herbs and Blood tonic herbs (see appendix 2, table 4).

Herb & Formula research

Gui Zhi (*Ramulus Cinnamomi Cassiae*)

A small scale trial involving fifteen women taking 333mg three times a day of cinnamon extract found improvement in insulin sensitivity (Wang *et al.*, 2007).

Western herbs

Nettle has been shown to bind human sex hormone binding globulin, which may in turn be able to reduce bio-available androgens (Schöttner *et al.*, 2007).

Spearmint (Mentha spicata) — In a small trial of twenty one females, Akdoğan *et al.,* (2007) found that a decoction of spearmint was able to decrease free testosterone and increase luteinizing hormone, follicle-stimulating hormone and estradiol (5g of spearmint in 250ml of water steeped for 5-10 minutes). A comparative trail using Bo He (Herba menthae haplocalycis) would be an interesting research project and may give greater insight into its role within classic formulae such as xiao yao san.

Herbal formula

Numerous studies have been conducted in Japan and China on the use of herbal formula for the treatment of PCOS. Some of these have been translated into English, though the majority have not. A selection of this research will be discussed below with the original name of the formula discussed in the research followed by the classical Chinese name where appropriate.

A clinical study conducted in China (Hua *et al.*, 2003) investigated the approach of Yishen Jianpi Yangxue tongli (translated as Tonify Kidney, strengthen Spleen, nourish Blood, dredge and eliminate) to treat PCOS. This publication illustrates the difficulty for the western researcher who cannot speak/read Chinese. At first glance the abstract appears to relate to a formula. It is only once the article has been translated that one can start to understand the design/rationale of the study. Hua *et al.,* conclude that the formula used for this pattern, an 'experienced' formula' from Dr Cai Song Yan (see appendix 2, table 5), was able to improve pregnancy rate and clinical symptoms, especially in clomiphene resistant patients. It was also found to reduce serum levels of luteum hormone and testosterone, and lead to improvement in Ferriman-Gallway score (a questionnaire designed to measure PCOS symptoms). There was a pregnancy rate of 65.7% compared to 25% in the control group using CC. Unfortunately there is no detail of the daily dosage or directions given.

Tiangui Fang recipe (TFR) (Hou *et al.*, 2000) (see appendix 1, table 6)

6 out of 8 patients had resumed a normal menstrual cycle and double phase basal body temperature (BBT). There was also reported to be a lowering in serum testosterone, body mass index (BMI), and serum LH. This study was ran alongside a control group who were taking metformin, with this study apparently showing greater efficacy (only two of the metformin group had double phase BBT, and no change in BMI or LH). Analysis showed that TFR was better able to restore a normal menstrual cycle than metformin, however metformin was more effective at lowering insulin levels.

Shakuyaku-kanzo-to (also referred to as TJ-68).

Chinese classical formula: Shao yao gan cao tang

In a trial involving 34 woman with PCOS, Takahashi & Kitao (1994) found TJ-68 to lower testosterone levels and to gradually regulate the LH-FSH ratio. Subjects were treated daily with 7.5 g of TJ-68 for a twenty four week period. Interestingly, whilst Bensky & Barolet (1990, p.252) say the actions of shao yao gan cao tang are to soften the Liver, moderate painful spasms and alleviate pain', it is said to me used mainly for muscle cramps and there is no reference to gynecological application.

Sarei-to (also known as Sai Rei-to)

Chinese classical formula: xiao chai hu tang and wu ling san

This Kampo formula is actually a mix of xiao chai hu tang and wu ling san.

Xiao chai hu tang wan comes from the 'formulas that harmonise' category in the Chinese materia medica. It is said to harmonise the shaoyang, and is primarily used for upper respiratory tract infections (Bensky & Barolet, 1990, p.252), whilst Wu ling San comes from the 'expel Dampness' category and drains Dampness, promotes urination, tonifies the Spleen and warms yang (Bensky & Barolet, 1990, p.252).

Sarei-to is usually used to treat conditions involving oedema, and Kidney disfunction – though this is Kidney disfunction from a western medical perspective. From the above it is hard to see why it was chosen by Sakai *et al.,* (1999) in their trial involving seventeen subjects. They found that after administration of 8.1g of formula for two months, twelve patients became ovulatory (70.6% success rate), and their serum LH and LH/FSH ratio significantly decreased.

Unkei-to

Chinese classical formula: Wen Jing Tang (WJT).

Whilst this formiula is referred to as Unkei-to, closer scrutiny reveals it to be the classical Chinese formula WJT. Yasui *et al.,* (2003) established from their

research on rats, that Unkei-to has stimulatory effects on the ovulatory process in the ovary and could stimulate ovarian steroidgenesis. They concluded that it could be a useful formula for regulating ovulation. This appeared to be a thorough study, though the assumption is made that one knows the herbs within the formula, as no detail is given. Ushiroyama *et al.,* (2001) found unkei-to to reduce plasma LH concentrations and encourage 'significant development of the follicle. Fifty percent of the 38 patients in the trial with PCOS were said to achieve successful ovulation after the eight week period of intravenous administration.

WJT has also been used in trials on rats and apears to increase LH-RH release (Miyake *et al.*, 1986). Yoshimoto *et al.*, (1988) studied 16 anoulatory women who failed to ovulate using 150mg of CC for 15 days. They then adminitered 5g of WJT daily from day 2 of the menstrual period along with 150mg of CC and recorded ovlation in 43.8% of patients, though none conceived. This would suggest that WJT may complement CC, however another control group taking only WJT would have been appropriate to support this hypothesis.

Ushiroyama *et al*.,(2006) found that in cases where PCOS patients were not responding to formulae prescribed in the traditional way, they did respond to WJT. The formulas Dang Gui Shao Yao San had been prescribed in 43 cases, and Gui zhi Fu Ling Wan in 21 cases. When patients were switched to WJT the ovulation rate was found to be 59.3% as opposed to 7.4% in those who stayed

with their original prescription. This research paper had strict controls, dosage details were given and in contrast to other research papers, not only were ingredients and rationale included, but also details of brand and supplier. Sun *et al.,* (2004) conducted research on WJT's effect on granulosa cells. According to Havelock (2004), granulosa cells are responsible for conversion of androgens to estrogens, as well as progesterone synthesis (as discussed earlier, in PCOS is an increase of androgen levels). Bai shao *(Radix Paeoniae Lactiflorae*) and gui zhi (*Ramulus cinnamomi cassiae*) were seen to stimulate estradiol secretion, whilst ren shen *(Radix ginseng)* was found to stimulate progesterone secretion. They concluded that the ingredients in WJT had a collective regulating effect on the granulosa cells. This was a thorough study and full details were given of the research.

Gan Shao Capsule (GSC)

Yang and Zhang (2005) conducted an experiment using GSC in clomiphene resistant PCOS. This was a small scale trial involving twenty seven patients over the course of eight weeks. After the eight week period, patients who still had serum testosterone levels less than 2.1 nmol/L without ovulation, were given CC to induce ovulation. The GSC appeared to make patients more responsive to CC, and in those who did not need CC (8 patients), there was restoration of natural ovulation in six and pregnancy in two. Within this formula there are only four

ingredients: Gan cao *(Radix Glycyrrhizae Uralensis),* Chi shao yao *(Radix Paeoniae Rubrae)*, Wu ling zhi *(Excrementum Trogopteri seu Pteromi),* Ze lan *(Herba Lycopi Lucidi)* (see appendix 2, table 7), however, the only reference to dosage was that each capsule given contained 0.3g raw herbs and 4 capsules were taken, three times a day. There was no discussion of individual herb quantities. The paper gives no history of the formula and they do not appear to be based upon a classical formula. Compared to the other formulas discussed in this paper, this formula appears to focus more on moving Blood stagnation rather than transforming Damp/Phlegm or addressing underlying deficiencies, though there is no reference to this in the research.

Integrative treatment

There has been some research into using Chinese herbal formula/herbs alongside Western pharmaceutical drugs.

Song *et al.,* (2006) review numerous cases of Chinese herbal formulae being prescribed alongside drugs. The original articles are in Chinese and not accessible, but as a point of interest, brief detail will be given here, drawn from the paper by Song *et al.,* (2006).

In a trial involving forty six patients, Xia & Guo (2005) (cited in Song *et al.*, 2006) used a herbal formula (see appendix 2, table 8) for two months, and then

additionally administered 50-100mg of CC once a day from day 5 to 18 of the menstrual cycle. The control group were only given CC and this was only from day 5 to 9 of the menstrual cycle. If this summary is correct, then the control did not adequately reflect the treated group (i.e different times of cycle treated for different lengths of time). The results were impressive, with 82.8% in the treated group achieving ovulation, compared to 40% in the control group, and 52.2% falling pregnant compared to 22.5% in the control group. The approach appears to be one of nourishing Kidney yin and yang, nourishing Liver qi and eliminating Blood stagnation (appendix 1, table 8), However, in light of the poor controls imposed, it is hard to take these figures seriously.

Song *et al.,* (2006) also discusses the research of Ren (2002). In this trial 58 patients who had not ovulated after 6 months of treatment with 50-100mg of oral CC, were split into two equal groups and one group given CC and tamoxifen, whilst the other was given CC and Zhuyan recipe (see appendix 2, table 9). This recipe seems to tonify Kidney yin and yang, strengthen Spleen and eliminate Blood Stagnation. The pregnancy rate of those taking CC and tamoxifen was 35.71%, whilst the rate in those taking CC and Zhuyan recipe was 63.3%. Luteal phase defect was also seen to be lower in group taking Zhuyan.

Gan cao and spironolactonereduced

Armanini *et al.,* (2007) found in their trial involving 32 women with PCOS, that adding 265mg of gan cao *(Radix Glycyrrhizae Uralensis)* per day to the drug spironolactonereduced (SP) reduced the side effects of the SP and particularly the prevalence of metrorrhagia. Gan cao is also said '..to possess estrogen-like activity' (p.67), which may be of value in treating those with PCOS. Full details were given of dosage and results, and analysis.

Conclusion

This review highlights that the traditional approach to Chinese herbal treatment (that of first arriving at a diagnosis using pattern differentaition and then to prescribe a suitable formula for that diagnosis), is not always taken. The effects of formulae are often now measured against changes in hormone levels. In this respect, TCM is becoming 'westernised' , however, as most of the research reviewed here showed little evidence of of double blinding, along with poor detail of methods and materiels, misisng information and poor explanation, there appears to be along way to go before this 'westernisation' gains any real credibility in the eyes of western sacience. These conclusions are in accordance with those of Zhang *et al*., (2008) who found many omissions in the reports of trials conducted in China, and recommedned 'sunstantial improvements' (p.7) be made.

Japanese research was more thorough, though the different interpretation and application of formula used in Kampo and TCM is confusing at times. The trend appears to be toward analysing the action of TCM herbs and formula using WM techniques, with some attempt at the 'one pill fits all' approach typical of western pharmaceuticals (as in the case of Wen Jing Tang). The combined use of herbal formula and pharmaceuticals does expand the field of herbal medicie research, though and highlights the fact that clinically, as a herbalist one can feel confident prescribing some of the aforementioned herbal formula alongside some of the western the pharmaceuticals used in PCOS. Not only has it been proven safe to do so, but in some instances, it may also have a synegistic effect - one enhancing/complementing the action of the other.

Perhaps further research into the biochemical action of individual herbs may not only widen the choice of herbs one can use in treating PCOS (such as nettle and bo he), but may also lead to completely new formulas, whist the rationale for application may be based more upon results of hormone tests than on pattern differentiation.

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Appendix 1.

Comparison of the three sets of diagnostic criteria used for identifying PCOS.
(Extracted from Dasgupta & Reddy, 2008)

	NICHD/1990	Rotterdam/2003	AES/2006
Diagnostic criteria	Requires simultaneous presence of: 1. Clinical and/or biochemical hyperandrogenism 2. Menstrual dysfunction	Requires the presence of at least two criteria: 1. Clinical and/or biochemical hyperandrogenism 2. Ovulatory dysfunction 3. PCOM	Requires the presence of hyperandrogenism, clinical or biochemical, and either: 1. Oligo-anovulation or 2. PCOM
Exclusion criteria	Congenital adrenal hyperplasia, androgen secreting tumours, Cushing's syndrome and hyperprolactinaemia	Congenital adrenal hyperplasia, androgen secreting tumours and Cushing's syndrome	Congenital adrenal hyperplasia, androgen secreting neoplasms, androgenic/anabolic drug use or abuse, Cushing's syndrome, syndromes of severe insulin resistance, thyroid dysfunction and hyperprolactinaemia
Clinical traits	Hirsutism, alopecia and acne	Hirsutism, acne and androgenic alopecia	Hirsutism
Biochemical traits	1. Total testosterone 2. Free testosterone 3. Androstenedione 4. DHEA	1. Free androgen index or free testosterone 2. Total testosterone 3. DHEA	1. Free androgen index or free testosterone 2. Total testosterone 3. DHEA 4. Androstenedione
PCOM	Not included	At least one ovary showing either: 1. Twelve or more follicles (2-9 mm in diameter) or 2. Ovarian volume - 10 ml	At least one ovary showing either 1. Twelve or more follicles (2-9 mm in diameter) or 2. Ovarian volume - 10 ml

NICHD - National Institute for Child Development and Human Diseases, AES - Androgen Excess Society, PCOM - polycystic ovary morphology, DHEA - dehydroepiandrosterone, adapted from codner and escobar-morreale, 2007)[5]

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Appendix 2

Below are the formulas mentioned within the text, with details of dosage where available and function of the herb within the formula.

Table 1. Yu Shu Wen Bu Fang (Maciocia, 1998; Flaws, 2005)

Herb	Function	Grams
Shu Di Huang (*Radix Rehmanniae Glutinosae Praeparata)*	tonifies Blood and essence	9g
Huang Jing *(Rhizoma Polygonati*)		9g
Xian Ling Pi *(Herba Epimedii)*	Tonify Kidney yang	6g
Bu Gu Zhi *(Fructus Psoraleae Corylifoliae)*		6g
Chuan Shan jia *(Squama Manitis Pentadactylae)*	disperses xue stasis, unblocks menstruation	6g
Zao Jiao Ci *(Spina Gleditsiae Sinensis)*	resolve Phlegm and soften masses	6g
Yi yi ren *(Semen Coicis Lachryma-Jobi)*		9g
Zhe Bei Mu *(Bulbus Fritillariae Thunbergii)*		6g

Table 2. Cang Fu Dao Tan Wan (Flaws, 2005; Maciocia, 1989; Lyttleton, 2004)

Herb	Function	Grams
Chen Pi *(Pericarpium Citri Reticulatae)*	Resolve Dampness and Phlegm	6-9
Fu Ling *(Sclerotium Poriae Cocos)*		6-9
Ban Xia *(Rhizoma Pinelliae Ternatae)*		6-9
Tian Nan Xing *(Rhizoma Arisaematis)*		3-9
Cang Zhu *(Rhizoma Atractylodis)*		9
Zhi Xiang Fu *(Rhizoma Cyperi Rotundi processed with honey)*	Move qi and eliminate stagnation	9
Zhi Ke *(Fructus Citri Aurantii)*		6-9
Sheng Jiang *(Rhizoma Zingiberis Officinalis Recens)*	Promote digestion	2-3 slices (6g)
Shen Qu *(Massa Medica Fermentata)*		6-9
Zhi Gan Cao *(Radix Glycyrrhizae Uralensis)*	Harmonise	6-9

78g

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Gui Shao Di Huang Tang (Lyttleton, 2004)

Herb	Function	Grams
Shu Di Huang *(Radix Rehmanniae Glutinosae Praeparata)*	**Liu Wei Di Huang Wan. Nourish Liver and Kidney yin.**	10g
Shan Zhu Yu *(Fructus Corni Officinalis)*		10g
Shan Yao *(Radix Dioscoreaw Oppositae)*		10g
Fu Ling *(Sclerotium Poriae Cocos)*		15g
Mu Dan Pi *(Cortex Moutan Radicis)*		10g
Ze Xie *(Rhizoma Alisatis Orientalis)*		15g
Dang Gui *(Radix Angelicae Sinensis)*	Enrich Blood and nourish yin (Liu & Chen, 1999)	10g
Bai shao yao (Radix Paeoniae Lactiflorae)		10g

Table 4. Xiong gui ping wei san (Lyttleton, 2004)

Herb	Function	Grams
Cang Zhu *(Rhizoma Atractylodis)*	Resolve Dampness and Phlegm	No dosage given
Chen Pi *(Pericarpium Citri Reticulatae*		No dosage given
Hou Po *(Cortex Magnoliae Officinalis)*		No dosage given
Zhi Gan Cao *(Radix Glycyrrhizae Uralensis)*	Harmonise	No dosage given
Sheng Jiang *(Rhizoma Zingiberis Officinalis Recens)*	Promote digestion	No dosage given
Da Zao *(Fructus Jujubae)*	Nourishes Blood.& tonify the middle	No dosage given
Dang Gui *(Radix Angelicae Sinensis)*	Nourish and move Blood and qi	No dosage given
Chuan Xiong (Radix		No dosage given

Ligustici Wallichii)		

Table 5. Empirical formula of Dr Cai Song Yan (Hua *et al.*, 2003)

Herb	**Action**	**Dose**
Tu Si Zi (Semen Cuscutae Chinensis)	Tonify yang	12g
Che qian zi *(Semen Plantaginis)*	Clears the Liver. Transforms Phlegm.	10g
Yin yang huo (Xian Ling Pi) *(Herba Epimedii)*	Tonify yang	10g
Du zhong *(Cortex Eucommiae Ulmoidis)*	Tonify yang	10g
Dang Gui *(Radix Angelicae Sinensis)*	Moves Blood.	10g
Tao ren *(Semen Pruni Persicae)*	Moves Blood. Eliminates accumulations	10g
Yi yi ren *(Semen Coicis Lachryma-Jobi)*	Strengthens the Spleen. Eliminates obstruction. Clears Heat. Drains the pus.	10g
Chuan Xiong (Radix Ligustici Wallichii)	move Blood and qi	3g

Table 6. Tiangui Fang recipe (TFR) (Hou *et al.*, 2000)

Herb	**Function**	**Grams**
Zhi mu *(Rhizoma Anemarrhenae Asphodeloidis)*	Clears Heat. Disperses Fire. Nourishes Yin	None given
Bie jia (Carapax Amydae Sinensis)	invigorates Blood, nourishes yin	None given
Mai dong *(Tuber Ophiopogonis Japonici)*	Promotes generation of Body Fluids.	None given
Yu zhu *(Rhizoma Polygonati Odorati)*	Nourishes Yin.	None given
Dang Gui *(Radix Angelicae Sinensis)*	Tonifies Blood & Moves Blood. Calms pain.	None given
Bu gu zhi *(Fructus Psoraleae Corylifoliae)*	Tonifies the Kidneys. very hot. Strengthens the Yang.	None given
Shi chang pu *(Rhizoma Acori Graminei)*	Opens the orifices. Calms the Mind. Transforms Dampness. Harmonizes the Stomach	None given

Hu zhang *(Rhizoma Polygoni Cuspidati)*	Moves Blood. Calms pain. Clears Heat. Drains Dampness. Transforms Phlegm	None given
Ma bian cao (Herba Verbenae)	Blood invigorating	None given
Yin yang huo (Xian Ling Pi) *(Herba Epimedii)*	Tonify yang	None given
Shu Di Huang *(Radix Rehmanniae Glutinosae Praeparata)*	Nourishes Yin and Blood. Tonifies the Essence. Strengthens the Marrow	None given
Tao ren	Moves Blood. Eliminates accumulations.	None given

Table 7. Gan Shao capsule (Yang and Zhang, 2005)

Herb	**Function**	**Grams**
Gan cao *(Radix Glycyrrhizae Uralensis)*	Calms acute pain. Regulates the nature of other drugs. Tonifies the Spleen	None given
Chi shao yao *(Radix Paeoniae Rubrae)*	Clears Heat. Cools Blood. Eliminates Blood accumulation. Calms pain.	None given
Wu ling zhi *(Excrementum Trogopteri seu Pteromi)*	Moves Blood. Calms pain. Transforms Blood accumulation	None given
Ze lan *(Herba Lycopi Lucidi)*	Moves Blood. Eliminates Blood stasis	None given

Table 8. Research by Xia & Guo (2005) (cited in Song *et al.*, 2006)

Herb	**Function**	**Dose in Grams**
Xian Ling Pi *(Herba Epimedii)*	Warm the uterus Warm spleen and Kidney yang	15g
Rou Cong Rong *(cistanche)*		15g
Zi Shi Ying *(fluoritum)*		12g
Bu Gu Zhi *(psoralea)*		12g
Lu Jiao Shuang (Cornu Cervi Degelatinum)		12g
Ba Ji Tian *(morinda root)*		12g

Tu Si Zi (Semen Cuscutae Chinensis)		12g
Huang Jing (Rhizoma Polygonati)	Nourish Kidney yin, tonify spleen	12g
Nu Zhen Zi (Fructus Ligustri Lucidi)	Nourish Kidney and Liver	12g
Niu xi (Radix Achyranthis Bidentatae)	Invigorate Blood	12g
Gui Ban (Plastrum Testudinis)	Nourishes Kidney Yin. Subdue Yang. Nourish Blood	12g
Pei Lan (Herba Eupatorii)	Transforms Dampness	12g
E Zhu (Rhizoma Curcumae Ezhu)	Breaks up the Blood. Eliminates Blood accumulation. Moves Qi.	12g
Yu Jin (Tuber Curcumae)	Moves Blood & qi. Calms pain. Resolves qi stagnation. Cools Blood	12g
Lu Lu Tong (Fructus Liquidambaris Taiwanianae)	Clears Heat. Expels Wind. Eliminates Water. Calms pain	30g
Shan Zhu Yu (Fructus Corni Officinalis)	Tonifies Liver and Kidneys. Astringent	12g
Shan Yao *(Radix Dioscoreaw Oppositae)*	Nourish Liver and Kidney yin	15g
Mu Dan Pi (Cortex Moutan Radicis)	Clears Heat. Cools Blood. Moves Blood. Eliminates Blood accumulation	15g

Table 9. Research by Ren (2002) (cited in Song *et al.*, 2006)

Herb	**Function**	**Dose in Grams**
Shan Zhu *Yu (Fructus Corni Officinalis),*	Tonifies Liver and Kidneys. Astringent	6g
Shu Di Huang *(Radix Rehmanniae Glutinosae Praeparata)*	Nourishes Yin and Blood. Tonifies the Essence.	12g
Shan Yao *(Radix Dioscoreaw Oppositae)*	Nourish Liver and Kidney yin	12g
Fu Ling (*Sclerotium Poriae Cocos)*	Strengthen spleen	12g
Ba Ji Tian *(Radix Morindae Officinalis)*	Tonify Kidney yang	6g
Huang Jing *(Rhizoma Polygonati)*	Nourish Kidney yin, tonify spleen	12g

Mu Dan Pi *(Cortex Moutan Radicis)*	Clears Heat. Cools Blood. Moves Blood. Eliminates Blood accumulation	6g