

Effect and mechanism of Yupingfeng Powder on preventing recurrent respiratory tract infection in children with refractory nephrotic syndrome

Miao Peng^{1,a}, Chunying Liu^{2,b,*}, Caili Cao^{1,c}, Yuxin Jian^{1,d}

¹Shaanxi University of Chinese Medicine, Xianyang, 712046, Shaanxi, China

²Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang, 712000, Shaanxi, China

^a1713153437@qq.com, ^b970045767@qq.com, ^c644720773@qq.com, ^d782000492@qq.com

*Corresponding author

Abstract: Primary nephrotic syndrome in children is a group of clinical syndromes caused by the significant increase in the permeability of glomerular filtration membrane to plasma albumin and the loss of a large amount of albumin from urine due to various reasons. It is sensitive to hormones but easy to relapse, and may be dependent on hormones or resistant to drugs after repeated attacks, thus affecting the prognosis. Clinically, it is summarized as refractory nephrotic syndrome in children. Respiratory tract infection is one of the main factors causing the recurrence of refractory nephrotic syndrome in children. Yupingfeng Powder is the prescription of fuzheng Gubenjing, simple and effective, and it is widely used in clinic. Modern research confirmed that Yupingfeng can promote immunoglobulin IgA, IgG, IgE and monocyte macrophages, improve the immune function of the body, in recent years YuPingFeng alone or combined western medicine treatment of children repeated respiratory tract infection shows a unique curative effect and advantages, thus reducing the recurrence frequency of pediatric refractory nephrotic syndrome and frequency.

Keywords: Yupingfeng powder; pediatric refractory nephrotic syndrome; prevention

1. Introduction

Pediatric primary nephrotic syndrome is a group of clinical syndrome symptoms caused by pathophysiological changes such as massive proteinuria, hypoalbuminemia, obvious edema and hyperlipidemia due to glomerular basement membrane damage and increased plasma protein permeability. Related studies show that factors such as genes and environment play a major role in the development of the disease [1]. NS is also one of the most common glomerular diseases in children. The most common pathological type is small lesions, most children MCD is sensitive to glucocorticoid treatment, the vast majority of children within 4 weeks of glucocorticoid, called nephrotic syndrome hormone sensitive type, but at the same time, the accompanying problem is that in the process of hormone reduction recurrence and hormone dependence; A small number of hormone-resistant NS are collectively referred to as refractory nephrotic syndrome (RNS), of which 80% are frequently recurrent, which is one of the main causes of end-stage renal disease [2].

Clinical practice shows that the single treatment is difficult to achieve the desired effect, and Yupingfeng plays an important role in the prevention and treatment of pediatric refractory nephrotic syndrome [1], which has achieved good efficacy in clinical application and provides a new idea for clinical treatment.

2. Western medicine

2.1. Knowledge of the nephrotic syndrome

Nephrotic syndrome (NS) refers to a series of excluding secondary factors after other causes of glomerular basement membrane permeability increase as the main mechanism, clinical main manifestations for a large number of proteinuria (urinary protein > 3.5 g/d), hypoalbumin (plasma albumin < 30g / l), different degrees of edema, but or without hyperlipidemia, is a series of common glomerular disease clinical symptoms. According to the pathological types, five types of membranous

nephropathy, mesangial proliferative glomerulonephritis, microscopic lesion nephropathy, focal segmental glomerulosclerosis and mesangial capillary glomerulonephritis are the main pathological types. There are many reasons for the recurrent onset of frequent recurrent nephrotic syndrome, and the specific mechanism is difficult to clarify, which is generally related to the following factors: pathological type, immune dysfunction and infection, hypoproteinemia, repeated infusion of plasma albumin, lipid metabolism, hypercoagulable state, non-standard hormone therapy and others [3]. (See Figure 1)

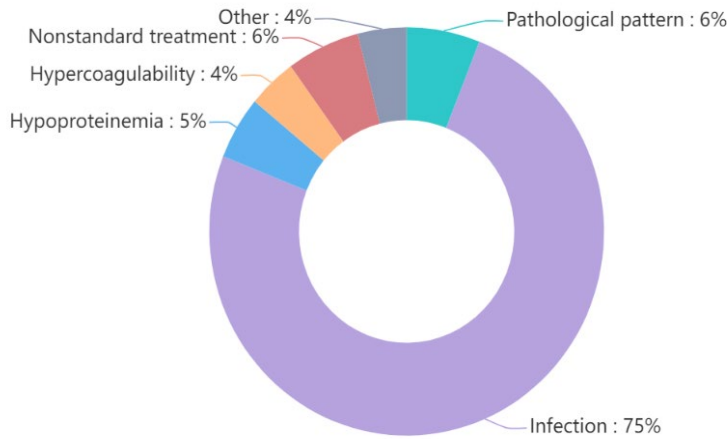


Figure 1: Analysis of the factors causing NS relapse

2.2. Treatment of nephrotic syndrome in Western medicine

The first choice for pediatric nephrotic syndrome is glucocorticoid, which follows the principle of "sufficient amount, slow reduction, long-term maintenance", and the curative effect is observed after eight weeks. If the upper respiratory tract infection occurs during the medication process, the hormone dosage needs to be adjusted to 0.5 mg/kg/d, and other types of infection should be stopped for 5-7 days. In the maintenance treatment phase, if there is repeated hormone dependence or adverse reactions, other alternative drugs, rituximab, cyclophosphamide, can be considered. At the same time, we should actively treat and prevent various complications. (See Figure 2) As the disease is long and the healthy qi is insufficient, it is easy to restore external evil, and then aggravate the condition, so exorcism and strengthening is the key to the treatment of the disease.

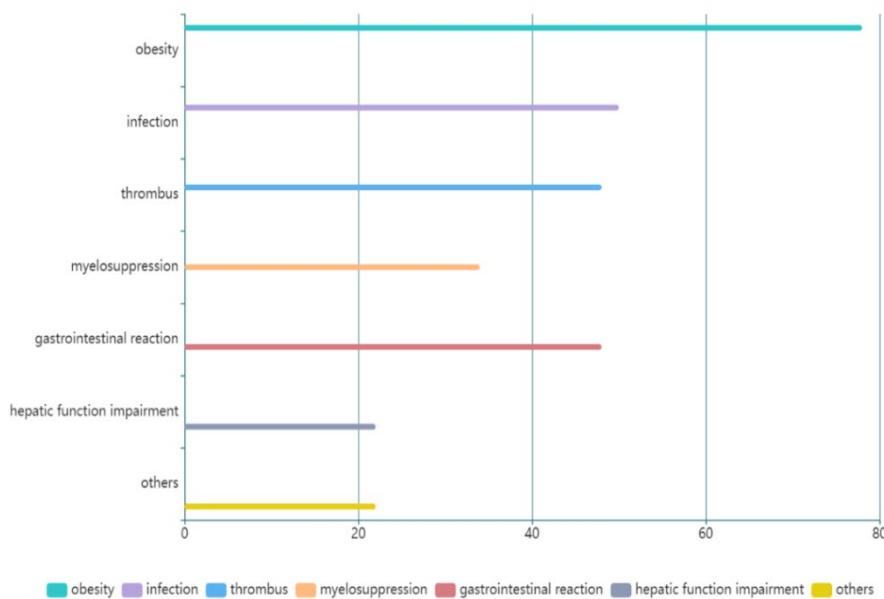


Figure 2: Common complications of NS

3. Traditional Chinese medicine treatment

3.1. Traditional Chinese medicine etiology and pathogenesis

Pediatric nephrotic syndrome in traditional Chinese medicine belongs to "edema", "urine" and other categories [4], exogenous wind evil clip with cold and hot gas, guest in the lung health, trapped in the muscle surface, the lung loss, water cloth is blocked, so that the wind suppressed water resistance, overflow in the skin for edema. Because of the function of lung, spleen and kidney, the transmission of lung bar, spleen, the opening and closing of kidney, trifocal and the gasification of bladder are abnormal. Lung, spleen and kidney dysfunction is the foundation, but the relationship with the kidney is more close, with the kidney as the foundation, with the lung as the standard, with the spleen as the water control; water dampness, dampness and blood stasis as the standard of the disease, which is the evidence of the deficiency and the deficiency (See figure 3) ; However, children's constitution is special, Wu Jutong in the "defense of children" put forward the characteristics of children's constitution is: "young Yang is not filled, childish Yin is not long"; pediatric ancestor Qian Yi believes that children's viscera is: "complete but not complete, complete but not strong"; Li Qian et al. believe that RNS pathogenesis mixed, emphasize the strengthening, prevent recurrent attacks; jade pingfeng powder for the classic [5], and medicine simple sweet, medicine light spirit, especially children viscera weak, easy deficiency easy real, easy cold and heat constitution.

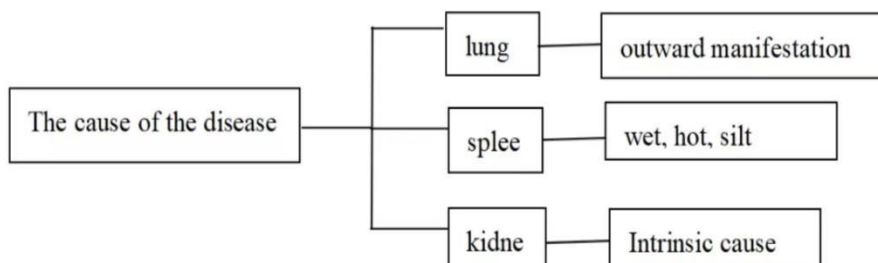


Figure 3: Etiological agents and pathogenesis of nephrotic syndrome

3.2. Application of yupingfen in refractory nephrotic syndrome in children

RNS in the early stage is mostly hormone sensitive, most of them will achieve urinary protein negative within 8 weeks, but more than 80% of children in half a year to a year after treatment recurrence, or repeated in drug withdrawal and two weeks of reduction; Another 10% of the children were hormone resistant, and urinary protein and edema did not improve [6] after eight weeks of standardized medication. (See Table 1)

Table1: Pediatric refractory NS

Stage	Classical syndrome type	Prevention and treatment
Early stage	Lung qi deficiency syndrome	Tonifying spleen and qi, nourishing Yin and nourishing body
Middle stage	Insufficiency of the spleen with overabundance of dampness	Tonifying spleen, warming kidney, nourishing qi and helping Yang
Later stage	Insufficiency of both the spleen and the kidney	Fill the temperature Yang, Guben peiyuan

First of all, in the stage of hormone impact, Zhao Lijun [7] believes that the invasion of external evil, lung temper deficiency and health table are the main pathogenic factors, dampness and heat, blood stasis are the main pathological products, therefore, in the treatment of the general principle, but also should also give consideration to clearing heat and dampness, promoting blood circulation and blood stasis. A large number of hormones will make the urine protein quickly reduce or turn negative, and accompanied by the decline of the body's immunity, it is particularly important to prevent respiratory tract infection at this time. Many experts and scholars believe that hormones are the product of Yang, Zhu Danxi in the "grid to Yu" extracted: "Yang often surplus, Yin often insufficient", so the use of a large number of hormones will consume jin injury Yin, resulting to the deficiency of qi and Yin two evidence, appropriate to choose banana heart, turtle armour, Astragalus, white and other yiqi, spleen and kidney products; Liu Chunying [8] believes that although early qi deficiency does not show, but considering children with low immunity, "lung and spleen deficiency", should be used in the early use

of jade pingfeng powder anti-infection at the same time, add sand ginseng, female seed, pollen, ink lotus and other restrictions to the temperature of astragalus, add poria to help spleen and water swelling. In the maintenance stage of hormone, the condition is relatively stable, mainly to consolidate the curative effect, Ren Xianqing, Ding Ying ^[9] believe that this period to nourish the spleen and kidney, qi and help Yang qi, evil qi, can promote the recovery of adrenal function, reduce the body's dependence on hormones, and effectively prevent recurrence. Sheng Lixian ^[10] found that with the reduction of hormones, there can be poor, fatigue, easy to sweat, tongue pale moss white greasy or yellow greasy and other wet retention of love, the treatment of the application of jade screen powder and three kernel soup or two Chen ping stomach powder plus and decrease. Zhang Jidong ^[11] Chinese medicine YuPingfeng loose and flavor to the course of nephrotic syndrome, patients randomly divided into YuPingfeng loose and flavor treatment group (37 cases) and control group (21 cases), treatment group using YuPingfeng loose and flavor and control group using western medicine, more than consistent treatment, YuPingfeng not only can only enhance the function of the body's cellular immune, and can significantly reduce the hormone caused by sweat, palpitations, discomfort symptoms, reduce the number of infection, promote the smooth withdrawal of hormone. Hormone reduction stop stage, at this time is the late stage of the disease, mostly for the spleen and kidney Yang deficiency qi deficiency, appropriate to fill the temperature Yang, strengthen the culture. Some scholars believe that long-term application of Yang heat products, kidney gas consumption, kidney Yin deficiency, Yin damage and Yang, evidence for spleen and kidney Yang deficiency, but long sick people, not cold heat, treatment appropriate flat repair spleen and kidney, do not need too warm dry products, using jade screen scattered with kidney gas pill plus and decrease. Therefore, yupingfeng powder can effectively reduce the infection and recurrence of RNS patients.

4. Mechanism of RNS upper respiratory tract infection

Yupingfeng powder comes from Danxi Heart method, which is composed of astragalus, atractylodes and windbreak. It is often used in the symptoms of sweating and susceptible to wind evil. It is one of the classic prescriptions used in traditional Chinese medicine for strengthening. Since ancient times, there has been a saying: "the wind evil stay for a long time and not scattered, since the sweat is also easy". Jun medicine is astragalus, is the wind medicine, qi solid surface, solid wei collect sweat; white surgery is the minister medicine, white spleen clearing damp, make qi flow, spleen flourishing qi biochemical active, solid surface sweat work ^[12]; windproof has antipyretic, analgesic, anti-inflammatory, anti-allergy and immune regulation. Wind for assist, solid protect the gas of the camp, drive away in the evil of the table. Modern medical research shows that the main active components of Astragalus are flavonoids, which are bacteriostatic and bidirectional immune regulation, and can treat kidney disease by regulating IgA, macrophages, Toll-like receptor 4 ^[13]; atractylodes can regulate immunity; the main active ingredient of windbreak is coumarin, and polysaccharide components can act on immune cells to regulate human immune function.

5. Summary

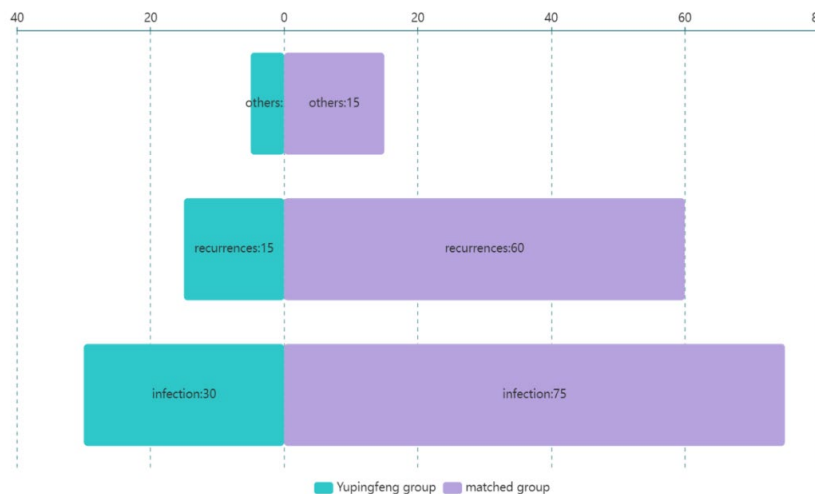


Figure 4: Comparison before and after yupingfeng powder treatment

Pediatric refractory nephrotic syndrome easy to relapse, the upper respiratory tract infection is the main cause, jade screen scattered in the treatment of nephrotic syndrome has its unique clinical advantages, in the prevention of repeated respiratory tract infection at the same time, and can improve the gas deficiency constitution^[14], also can effectively treat nephrotic syndrome immune dysfunction, hyperlipidemia, a large number of proteinuria, severe edema, reduce the number of infection, and recurrence frequency (See Figure 4); As well as for glucocorticoids and immunosuppressive agents caused by immune dysfunction, easy infection, lipid metabolism disorders and other symptoms have a significant improvement effect. Reduce the frequency of upper respiratory tract infection and thus reduce the number of recurrence, and improve the prognosis and quality of life of the children^[15]. Yupingfeng, as an auxiliary treatment method, is not only critical in the early use and the development of the course of the disease, but also persistent after the normal value.

References

- [1] Nephrology Group, Pediatrics Branch of Chinese Medical Society. Evidence-based guidelines for the diagnosis and treatment of hormone-sensitive, recurrent / dependent nephrotic syndrome in children (2016) [J]. *Chinese Journal of Pediatrics*, 2017, 55 (10): 729-734.
- [2] National research group on the diagnosis and treatment of common kidney disease in children. A multicenter study on the current situation of the diagnosis and treatment of hormone-sensitive, recurrent/dependent nephrotic syndrome in children in China [J]. *Chinese Journal of Pediatrics*, 2014, 52 (03): 194-200.
- [3] Chen Shuo, Xin Youqing, Zhao Wenjing. Wenjing Zhao's experience in treating primary adult micropathological kidney disease [J]. *TCM Guide*, 2022, 28(02):176-179. DOI:10.13862/j.cnki.cn43-1446/r. 2022.02. 021.
- [4] Wu Dongming, Tan Ping, Dong Jinli, Zeng Cuiqing, Yang Nizhi. Professor Yang'izhi experience in the treatment of microscopic nephropathy with syndrome differentiation [J]. *World Science and Technology-Modernization of Traditional Chinese Medicine*, 2020, 22 (04): 1137-1141.
- [5] Wei Yulin, Yang Kaiguo. Progress in clinical application of Yupingfeng Powder [J]. *Modern distance education of Traditional Chinese Medicine in China*, 2023, 21 (04): 206-208.
- [6] Wang Zhimin, Li Zhiqiang. Hormone-resistant nephrotic syndrome and its drug treatment in children [J]. *Journal of Practical Medicine*, 2013, 30(08):755-756. DOI:10.14172/j.cnki. issn1671-4008.2013.08.053.
- [7] Li Xiaoxiao. Professor Zhao Lijun's experience in pediatric treatment of refractory nephrotic syndrome [D]. *Liaoning University of Traditional Chinese Medicine*, 2015.
- [8] Zhao Yazhou, Gao Hang, Liu Chunying. Liu Chunying combined with Yupingfeng Powder to treat children with frequency recurrent nephrotic syndrome [J]. *Journal of Chengdu University of Traditional Chinese Medicine*, 2021, 44(03):56-59. DOI:10.13593/j.cnki.51-1501/r. 2021.03. 056.
- [9] Jiang Yingying, Ren Xianqing, Ding Ying, Zhang Xia, Wu Jingjing. Based on lung and kidney correlation, explore the susceptibility and prevention of children with nephrotic syndrome [J]. *Jilin Traditional Chinese Medicine*, 2021, 41(01):8-11. DOI:10.13463/j.cnki.jlzyy. 2021.01.003.
- [10] He Lina, Zhu Yongqin, Sheng Lixian. Sheng Li first clinical experience of pediatric recurrent nephrotic syndrome [J]. *Zhejiang Journal of Integrated Traditional Chinese and Western Medicine*, 2020, 30 (02): 94-95 + 100.
- [11] Zhang Jidong. Effect of Yuupongfeng powder on prednisone reaction and course of NS type I—Analysis of 58 cases [J]. *Journal of Liaoning University of Traditional Chinese Medicine*, 2000(01):21-22. DOI:10.13194/j.jlunivtcm. 2000. 01.22.zhangjd.013.
- [12] Wang Yingzheng, Mou Yue, Zhang Yanan. Progress in application and mechanism in clinical treatment of nephrotic syndrome [J]. *Journal of Liaoning University of Traditional Chinese Medicine*, 2022, 24(11):158-161. DOI:10.13194/j.issn.1673-842x. 2022.11. 032.
- [13] Yan Xiaohua, Yan Xianpeng. The immunomodulatory effect of Yupingfeng loose granules on children with nephrotic syndrome [J]. *Shaanxi Traditional Chinese Medicine*, 2015, 36 (10): 1311-1312.
- [14] Tong Zongwu. To prevent the recurrence of nephrotic syndrome [J]. *Liaoning Journal of Traditional Chinese Medicine*, 1998(05):18. DOI:10.13192/j.ljtc. 1998. 05.18.tongzw.014.
- [15] Xu Li. The effect of hormone withdrawal period in pediatric nephrotic syndrome [J]. *Practical integrated Chinese and Western medicine*, 2018, 18(03):59-60. DOI:10.13638/j.issn. 1671-4040. 2018. 03.030.