Effect of anti-bacterials on wound healing after surgery in ophthalmology and drug effect analysis

Zhai Juntao, Duan Duwen, Wang Xiufang and Zhang Shihua*
Yuncheng Central Hospital of Shanxi Province, Yuncheng City, Shanxi, China

Abstract: At present, most hospitals in China have the phenomenon of abuse of antibiotics. Hospitals usually give antibiotics to patients, so as to prevent infection after operation. But the use of a large number of antibiotics can cause the patient to produce antibodies to the antibacterials and reduce the sensitivity of the pathogen to the antimicrobial agents. The author studied the application of antibacterial drugs in ophthalmological surgery and carried out a comparative analysis. The total effective rate of the experimental group was 92.7%, the average healing time was (3.5±0.4) days, the total effective rate of the control group was 44%, the average healing time was (7.8±0.4) days, and the difference between the two groups was statistically significant ($P<0.05$). The results showed that the effect of antiseptic drugs on wound healing was obvious, and the healing time of the incision could be shortened significantly.

Keywords: Antiseptic drugs, ampicillin, ophthalmology surgery, anti-infection, healing time.

INTRODUCTION

The structure of the eyes is complex and fine, and it is one of the most important organs of the human body. Most eye surgery belongs to clean operation and the incidence of postoperative infection is very low, for example, the incidence of infection after selective intraocular surgery is 0.08% (Sun *et al*., 2015; Yang *et al*., 2014). If infection occurs after operation, the onset is fast and dangerous. The treatment effect is generally poor. It may be necessary to remove the eyeball. Therefore, antimicrobial agents play an important role in the anti infection treatment of Ophthalmology (Chen *et al*., 2011; Abu, 2017; Liu *et al*., 2017). Rational drug use can maximize the protection of the eyes from damage (Chen, 2012; Paccez *et al*., 2014; Li *et al*., 2016). In order to understand the preventive use of anti-bacterials in the perioperative period of Ophthalmology and promote the standardization and rational use of antibiotics, the relevant investigation and analysis were carried out in this paper. After the operation of Ophthalmology, antibiotics are often used to deal with the incision to prevent wound infection. According to the literature, the incidence of ophthalmic diseases is increasing year by year.

The key to the success of drug treatment is the accurate diagnosis of the infectious nature, the isolation of pathogenic bacteria and the determination of drug sensitivity (Fang *et al*., 2016; Shi *et al*., 2015). Then the most sensitive antibacterial agents are selected for treatment. Therefore, the selection of antimicrobial agents is very important (Huang *et al*., 2011). The antimicrobial spectrum of each antibacterials is not the same as that of the indications (Pan *et al*., 2011). The clinical diagnosis, bacteriological examination and drug sensitivity test can be used as an important reference for the selection of drugs (Dirk, 2014; Sahar *et al*., 2016). When selecting antibiotics, we must understand the antimicrobial spectrum and antibacterial properties of the drugs used in order to choose effective drugs (Fu *et al*., 2008; Ostojic *et al*., 2015). The combination of broad-spectrum antibiotics or antibiotics should be used for the infection of unknown pathogens (Zhong *et al*., 2017). Some drugs have unique characteristics and are more suitable for use in the ophthalmology (Yuvaraja *et al*., 2017). For example, the Pseudomonas research for 11 consecutive years showed that the sensitive rate of tobramycin was always above 90% (Liu *et al*., 2017; Wang *et al*., 2008; Jiao *et al*., 2017). Because fluoroquinolones are widely applied in various clinical departments, the resistance rate of main pathogenic bacteria is increasing. This study discusses the influence of antibacterial therapy on wound healing after ophthalmic surgery, and provides theoretical basis for clinical diagnosis and treatment.

MATERIALS AND METHODS

Clinical data

Data was collected From January 2016 to January 2017, a total of 110 patients who received ophthalmic surgery in the hospital were randomly selected for 55 cases as the experimental group (anti infection group), and the remaining 55 patients as the control group (non anti infection group). There was no statistically significant difference in clinical data between the two groups. It was comparable to that in table 1. All patients were approved by ethics committee of Yuncheng central hospital of shanxi province and signed on the informed consent.

Test method

At the same time, the medical records of the preventive use of antibiotics in the perioperative period of

**Corresponding author:* e-mail: zshmdzml@163.com

ophthalmology in our hospital were investigated, and the use rate of 2 antibiotics was analyzed. Ophthalmic hospital drugs is relatively simple, mainly with cefazolin, cefuroxime, clindamycin etc. Intravenous injection of 156 cases, including 141 cases, combined with 15 cases. The use of cefazolin was the highest, up to 61.5%. The combination was two, usually in combination with cefuroxime and metronidazole, combined with rate of 7.7%.

In this paper, we used the same surgical method for ophthalmic surgery (Tu *et al*., 2017). After suturing the incision, the patients in the experimental group were given ampicillin for anti infection treatment, while the control group did not use antibiotics to prevent it. The healing of incision was compared between the two groups (Barbara *et al*., 2015). The same infrastructure and dietary conditions must be taken for all patients after the operation. These processes need to be operated by the professional and strictly enforced.

STATISTICAL ANALYSIS

SPSS19.0 software is used to analyze the related data. The results were all expressed in X±s, and the count data were statistically treated by X^2 test, and the measurement data were statistically treated with t-test. Levene test or F test is used. Counting data is expressed by chi square. The difference of $P<0.05$ was statistically significant. The patch area changes before and after the treatment were measured by paired sample t test. The difference was statistically significant when the definition of $P<0.05$ was defined.

RESULTS

Postoperative wound healing

The healing time of the patients in the test group was less than 3day (D) healing in 16 cases.3 to 7d healed in 17 cases, > 8D healed in 32 cases. The healing time in the experimental group was shorter than that in the control group. There was a significant difference between the two groups ($P<0.05$), as showed in table 3.

Comparison of two groups of patients

The experimental group total effective rate was 92.7%, the average healing time was (3.5±0.4) d; the control group total effective rate was 44%, the average healing time was (7.8±0.4) d; there was significant difference between two groups ($P<0.05$) (table 4).

Comparison of the symptoms of the two groups of patients

Two groups of patients had postoperative pain, redness and other infection symptoms, but compared with the control group without using antibiotics to prevent postoperative infection, the infection symptoms of the experimental group were significantly reduced.

DISCUSSION

The incidence of ophthalmic diseases has been over 10% in China, and the incidence is increasing year by year (Fang *et al*., 2017). Therefore, eye diseases are attracting more and more attention from medical institutions. There are many kinds of ophthalmic diseases (Li *et al*., 2015; Tural *et al*., 2015). With the improvement of medical level, more and more treatment methods have been applied. Surgical treatment of ophthalmic diseases is one of the most important methods. For inverted eyelashes, glaucoma, cataract and other diseases, surgical treatment is usually the preferred treatment, and has a very good effect for most eye diseases (Nayir *et al*., 2015; Tang *et al*., 2017). After ophthalmic surgery, prone to complications such as wound infection, to prevent infection and complications, antibiotics are often used (Takahashi, 2017), such as ampicillin sodium is a common and very effective antibacterial drugs, usually dissolved in saline, intravenous drip, medication frequency according to a postoperative incision infection.

But the use of antibiotics has also had a negative impact on the use of antibiotics in the eyes of the domestic medical workers (Udagawa *et al*., 2012). The use of antimicrobial agents should be considered to reduce, because there are some antibiotics abuse in most hospitals, usually give patients injections of antibiotics, with the eyes and the surrounding area of prevention and control of ocular infection after surgery (Vekov *et al*., 2015), but large doses can cause the patient to produce antibodies to antibiotics and to reduce pathogen drug sensitivity to antibiotics, which makes the disease more difficult to cure, also significantly increase the difficulty of treatment for patients (Sun *et al*., 2015; Yang *et al*., 2014). Therefore, the postoperative patients should reduce the use of ampicillin, penicillin, erythromycin and other antibiotics. Support the party that is necessary after the use of antibacterial drugs, mainly because of infection after ophthalmic surgery situation is very common, if not timely treatment, have an extremely bad influence on patients, causing local redness, swelling and pain, some patients and even lead to eye ulcers or blindness (Chen *et al*., 2011; Abu, 2017). Therefore, it is of great significance to prove the effect of the use of anti-bacterials on the healing of the wound after ophthalmology.

CONCLUSION

When using antibiotics, we must understand the antimicrobial spectrum and antibacterial properties of the drugs used in order to choose effective drugs. The combination of broad-spectrum antibiotics or antibiotics should be used for the infection of unknown pathogens. The purpose of combined use is to play the synergistic effect of antibacterial agents, enhance efficacy, delay or reduce the emergence of drug-resistant bacteria, and

Table 1: Clinical data of two groups of patients

Type		Experimental group		Control group	
		Number	Proportion	Number	Proportion
Gender	Male	30	54.4	29	52.7
	Female	25	45.6	26	47.3
Age	<20	5	9.1	4	7.3
	20-30	8	14.5	9	16.4
	30-40	13	23.6	10	18.2
	40-50	18	32.7	21	38.2
	>50	11	20	11	20
Type of operation	Cataract	26	47.2	23	41.8
	Glaucoma	20	36.3	25	45.5
	Trichiasis	9	16.4	7	12.7

Table 2: Use of Anti-bacterials

Injecting drug	Number	Proportion
Cefazolin	96	61.5
Cefuroxime	21	13.4
Ampicillin	24	15.3
Cefuroxime + metronidazole	12	7.7
Cefepime + metronidazole	3	1.9
Total	156	100

Table 3: Different wound healing time

Healing time (day)	Experimental group		Control group	
	Number	Proportion	Number	Proportion
<3	16	29.1	6	10.9
3-7	31	56.4	17	30.9
>7	8	14.5	32	58.2

Table 4: Comparison of curative effect satisfaction

Curative effect	Experimental group		Control group	
	Number	Proportion	Number	Proportion
Invalid	4	7.3	19	34.5
Have some effects	16	29.1	15	27.3
Effective	25	45.5	9	16.4
Very effective	10	18.2	12	21.8

expand the scope of antibacterial activity, reduce the dosage of individual drugs and adverse reactions for acute or severe infections with mixed infection or unknown pathogens. In this study, 110 cases of patients undergoing ophthalmic surgery were mainly caused by inverted eyelashes, cataract and glaucoma. The difference between the two groups was statistically significant ($P < 0.05$), indicating that the use of antibiotics can significantly shorten the healing time of incision.

REFERENCES

Abu A (2017). Video-assisted thoracoscopic surgery for non-small cell lung cancer. *Mini. Invas. Surg. Oncol.*, **1**(1): 1-11.

Barbara B, Władysław L and Stanisław J (2015). ntiepileptic drugs and adverse skin reactions: An update. *Pharma. Repo.,* **67**(3): 426-434.

Chen D, Zhao Y and Zhang B (2011). Effects of Caulis Spatholobi extract on mice bearing S180, *Mod. Chin. Medi.,* **31**(3): 54-55.

Chen J (2012). Research Progress of TCM in Treating Acute Soft Tissue Injury. *Chi. J. Med. Guide*. **2**(2): 217-219.

Dirk W (2014). Antiseptic Drugs and Disinfectants. *Side Effe. Dru. Ann.,* **36**: 339-346.

Fang Q, Li Z and Zhou J (2016). Low-frequency pulsed electromagnetic fields promotes rat osteoblast differentiation in vitro through cAMP/PKA signal pathway. *J. Sout. Med. Univ.,* **36**(11): 1508-1513.

Fang W and Ruan W (2017). Advances in uniportal video-assisted thoracoscopic surgery for non-small cell lung cancer. *Min. Invasive. Surg. Oncol.*, **1**(1): 20-30.

Fu Q, Luo X and Tang Y (2008). The anti-tumor effect of extraction of Caulis Spatholobi object and effect on hematopoietic function, *Chi. J. Med.*, **15**(12): 29-31.

Huang W, Zhang L and Shu M (2011). Prostaglandin E2 promotes the cell proliferation ability of CCLP1 through EP2 prostanoid receptor which increased the expression of SnoN by activation of cAMP-PKA-CREB pathway. *Nan. Med. Univ. Press,* **31**(2): 143-148.

Jiao X, Yaping Z, Yuvaraja G and Weijiang Z (2017). Antibacterial property and biocompatibility of Chitosan/Poly (vinyl alcohol)/ZnO (CS/PVA/ZnO) beads as an efficient adsorbent for Cu(II) removal from aqueous solution. *Coll. Surfa. B: Bioin.,* **156**: 40-348.

Li B, Li Y and Pan H (2016). The effect of Yiqi clearing heat and nourishing Yin on the advanced cachexia of lung cancer mice, *Chin. Medi. Mate.*, **39**(6): 1389-1392.

Li X, Ren D, Li Y, Xu J, Liu C and Zhao Y (2015). Increased cancer risk associated with the -607C/A polymorphism in interleukin-18 gene promoter: an updated meta-analysis including 12,502 subjects. *J. Buon.*, **20**(3): 902-917.

Liu F, Xie J and Li F (2017).The effect and mechanism of anti Lewis lung cancer *in vivo* and *in vivo* and *in vitro*, *Chi. J. Pha.*, **52** (7): 581-586.

Liu Z, Yang R and Shao F (2017). Anastomosis using complete continuous suture in uniportal video-assisted thoracoscopic bronchial sleeve lobectomy. *Mini. Invas.e Surg. Oncol.*, **1**(1): 31-42.

Nayir E, Ata A and Arican A (2015). Do medical oncologists and cancer patients care about treatment costs of systemic anticancer therapy? *J. Buon.*, **20**(6): 1606-1611.

Ostojic SM, Knezevic DR, Perisic M, Jurisic V and Knezevic SM (2015). The importance of choice of resection procedures in T1 and T2 stage of carcinoma of the ampulla of Vater. *J. Buon.*, **20**(5): 1206-1214.

Paccez J, Vogelsang M and Parker M (2014). The receptor tyrosinekinase Axl in cancer: Biological functions and therapeutic implica-tions. *Int. J. Cancer*, **134**(5): 1024-1033 .

Pan Y, Zhou L and Yin D (2011). Effect of cellular immune function in mice with Chaihu Longmu Decoction on Lewis lung cancer, *J. Clin. Onco.*, **16**(3): 211-215.

Sahar K, Sotiria P, Hajirah N, Esen K and Guillermo A (2016). Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis- A Comprehensive Review and Guide to Therapy. I. Systemic Disease. *The Ocular Surf.*, **14**(1): 2-19.

Shi Z, Li Y and Kang Y (2015). Piperonal Ciprofloxacin hydrazone induces growth arrest and apoptosis of human hepatocarcinomaSMMC-7721 cells. *Acta. Phar. Sin.,* **33** (2): 271-278.

Sun J and Shi Z (2015). Trimethoxy-benzaldehyde levofloxacin hydrazine inducing the growth arrest and apoptosis ofhuman hepatocarcinoma cells. *Canc. Cell. Int.*, **13**(1): 67.

Takahashi Y (2017). Real-time intraoperative diagnosis of lung adenocarcinoma high risk histological features: a necessity for minimally invasive sublobar resection. *Minim. Invas. Surg. Oncol.*, **1**(1): 12-19.

Tang N, Li X and Huo F (2017). Effect of levofloxacononone chalcone derivatives on the apoptosis and autophagy of human HCC SMMC-7721 cells. *West Chi. J. Phar. Sci.,* **32**(1): 28-32.

Tu A, Laurence V, Pierre W and Olivier C (2017). Severe cutaneous adverse reactions to drugs. *The Lancet*, **390**(106): 1996-2011.

Tural D and Kivrak Salim (2015). Is there any relation between PET-CT SUVmax value and prognostic factors in locally advanced breast cancer? *J. Buon.*, **20**(5): 1282-1286.

Udagawa H, Ueno M, Shinohara H, Haruta S, Kaida S, Nakagawa M and Tsurumaru M (2012). The importance of grouping of lymph node stations and rationale of three-field lymphoadenectomy for thoracic esophageal cancer. *J. Surg. Oncol.*, **106**(6): 742-747.

Vekov T, Lebanova H and Grigorov E (2015). Pharmacotherapeutic recommendations for application of target oncological drug therapies for treatment of breast cancer in Bulgaria - therapeutic efficacy and cost effectiveness. *Asian Pac. J. Surg. Oncol.*, **20**(6): 1420-1425.

Wang S, Wang Zongren and Wang Siwang *et al*. (2008). Experimental study on the anti Lewis lung cancer of mice by YunFeiSanjie capsule. *Chin. J. Integ. Traditi. Chin. West. Medic. First Aid*, **15**(5): 289-292.

Yang X, Liu La and Ma M (2014). Effect of Tanreqing Injection on immune function of mice with Lewis lung cancer chemotherapy model, *J. Immun.*, **4**(10): 865-868.

Yuvaraja G, Janak L and Weijiang Z (2017). Antibacterial and wound healing properties of chitosan/poly(vinyl alcohol)/zinc oxide beads (CS/PVA/ZnO). *Interna. J. Biol. Macr.*, **103**: 234-241.

Zhong L, Jingting G, Qingfeng H, Jie W and Donghui L (2017). Enhanced antibacterial and wound healing activities of microporous chitosan-Ag/ZnO composite dressing. *Carbo. Poly.*, **156**: 460-469.