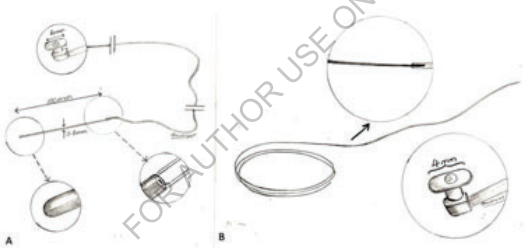
b. An anatomy (or mechanical effect) of a stent widens a narrow area due to adhesions caused by inflammation and formation of fibrosis on the canalicular tract. Mechanically increases the lumen diameter and according to Poiseuille's law (the flow rate is proportional to the pressure difference divided by resistance, but the fourth power dependence on the radius is very maximum) drainage increases. Therefore leaving the stent for a longer time can enlarge the lumen.

c. The stent straightens various canalicular bends which cause better flow through the canalicular tract.

Monocycalular lacrimal intubation device

A. MonokaTM stent

Monoka (Mono = single, ka = canalicular) is a silicone stent that has a different length for children and adults. Composed of metal or blue / black



monofilament yarn at the ends which helps use through narrow channels. Punctal fixation device (PFV) is located at the proximal end consisting of an oval sheath (3-4 mm), a vertical hollow tube (2 mm) and a horizontal ball on a vertical and horizontal tube joint. It can reduce trauma, prevent migration of the canal, help when removing the stent and is the only structure that looks externally once the stent is inserted. The horizontal part of the ampulla becomes a barrier. Silicone stents have an outer diameter of 0.64 mm with a length of 80 mm and a wide metal of 0.8 mm. In the umen section (0.3mm) it can be used for easier and safer insertion with the help of a special inserter plug or can also be used for a punching spreader. 25,26

Image 10: Monoka TM stent

Quoted from: Manpreet Singh, Journal of the Delhi Ophthalmological Society

B. Mini-Monoka TM Stent

Smaller variant of the Monoka stent and used mainly for proximal lacrimal system intubation (pungtum and canaliculi) with a length of 30 mm. Various studies have proven the use of this stent under conditions of stenosis and obstruction. 25,26

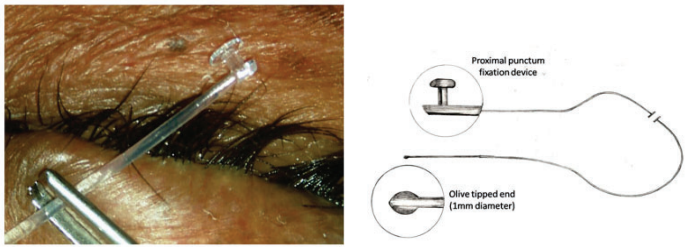


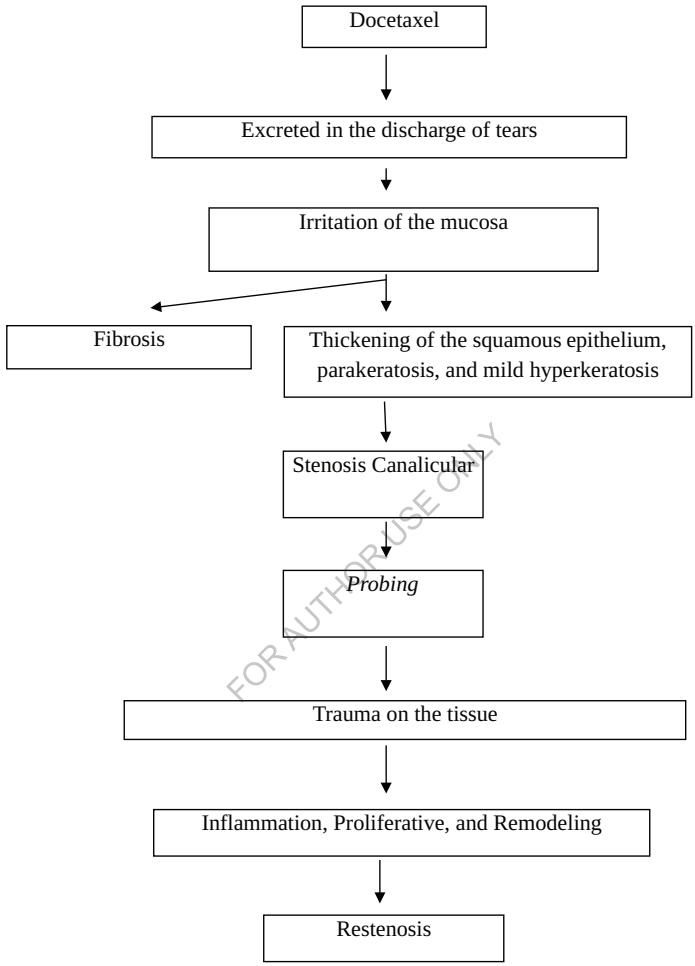
Image 11: Mini Monoka TM Monoka-Crawford stents & Stents

Quoted from: Manpreet Singh, Journal of the Delhi Ophthalmological Society

C. Stent Monoka-Crawford

Modification of the Monoka stent is made by attaching Crawford type metal to the tip. Installation of the end portion reduces complications in the form of trauma through canaliculus and NLD together with easy installation on the endonasal section with specially designed Crawford hooks.27,28

2.6 Theoretical Framework



a dilatator, then the probe is inserted into the lacrimal sac. Canalicular probing can relieve mucosal adhesions in the canalicular tract but can also result in additional inflammation due to injury when probing and can cause damage and release of inflammatory cells that can cause inflammation and restenosis in canalicular.2,3, 5 Bita Esmaeli et all, reported that probing can determine the location of the obstruction and reduce canalicular stenosis caused by inflammation because docetaxel is secreted in the tears resulting in damage to the canalicular mucosa. Leyssen, B et al. Reported an improvement in epiphora complaints in patients who were taking probing and after that were given sodium hyaluronate eye drops and steroid eye drops. 5,6

Sodium hyaluronate eye drops therapy shows the same effectiveness with steroid drops in inhibiting the progression of inflammation and fibrosis in the tear removal system, and gives minimal eye effect. It was reported that the Epidermal Growth Factor (EGF) content found in sodium hyaluronate can facilitate repair of wounds by increasing cell migration and mitosis with minimal side effects on the eye. Therapy for steroid eye drops has been shown to affect all wound healing processes, which are divided into 3 phases, namely: inflammation, proliferative, and remodeling. In fact, these three phases overlap significantly, the cascade starts in 1 phase which can affect cell growth and differentiation in the next phase but by giving in the long term can give eye side effects namely glaucoma and cataracts.

Although there have been documented reports from the previous literature about canalicular stenosis as a side effect of the drug chemotherapy agent docetaxel, the exact incidence of direct side effects obtained is not known with certainty. The incidence of excessive tear output (epiphora) data on symptom length, severity and proportion of cases associated with blockage of the lacrimal tract in patients receiving docetaxel chemotherapy in breast cancer there are no data in Indonesia. Research on the evaluation of epiphoreic symptoms using epiphoric degrees and canalicular stenosis levels before and after probing with eye drops has not been widely studied. In addition, the absence of data regarding Indonesia in epiphorous disorders and canalicular stenosis in patients with breast cancer (KPD) treated with docetaxel before and after probing and administration of sodium hyaluronate and steroid drops in RSMH made researchers interested in conducting research on matters 3.3

1.2 Problem Formulation

Is there a difference in canalicular stenosis between breast cancer patients who did probing with sodium hyaluronate eye drops compared to steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Moh. Hoesin Palembang?

1.3 Hypothesis

H0 = There is no difference in canalicular stenosis between breast cancer sufferers who performed probing with sodium hyaluronate eye drops compared with steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Moh. Hoesin Palembang

H1 = There is a difference in canalicular stenosis between breast cancer patients who performed probing with sodium hyaluronate eye drops compared with steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Hospital. Moh. Hoesin Palembang

1.4 Research objectives

1.4.1 General Purpose

To assess the existence of differences in canalicular stenosis between breast cancer patients who performed probing with sodium hyaluronate eye drops compared with steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Moh. Hoesin Palembang.

1.4.2 Special Purpose

a. To assess the presence of canalicular stenosis before probing in breast cancer patients at Dr. Moh. Hoesin Palembang.

b. To assess the improvement of canalicular stenosis after probing with sodium hyaluronate eye drops in breast cancer patients treated with the docetaxel chemotherapy agent in Dr. Hospital. Moh. Hoesin Palembang.

c. To assess the improvement of canalicular stenosis after probing with steroid drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Moh. Hoesin Palembang.

d. To analyze the differences in canalicular stenosis improvement between breast cancer patients who performed probing with sodium hyaluronate eye drops compared with steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents in Dr. Hospital. Moh. Hoesin Palembang

1.5 Benefits of Research

a. Theoretical benefits

Adding scientific evidence about the difference between canalicular stenosis between breast cancer sufferers who performed probing with sodium hyaluronate eye drops compared with steroid eye drops in breast cancer patients treated with docetaxel chemotherapy agents.

b. Applied Benefits

It is considered the oncology surgeon to work with eye specialists in evaluating the treatment of docetaxel chemotherapy agents.

c. Benefits to the community

Patients with breast cancer (KPD) can get therapy with docetaxel chemotherapy agents with minimal side effects

CHAPTER II

LITERATURE REVIEW

2.1 Definition of Canalicular Stenosis

Canalicular stenosis is the occurrence of blockage or attachment to the canalicular tract (the channel that drains tears from the lacrimal sac to the nose). Kanalikular is included in the lacrimal system as a component of the tear excretion / drainage system

2.2 Pathogenesis of Canalicular Stenosis

The pathogenesis of canalicular stenosis is the process of inflammation of the canalicular canal mucosa which causes thickening of the squamous epithelium, which subsequently results in parakeratosis and hyperkeratosis of the squamous epithelium. This condition causes inflammation which triggers the accumulation of infiltrates and plasma cells in the mucous wall which will cause damage to the canalicular mucosa, docetaxel is secreted in the tear drainage system and causes drug accumulation in the canalicular mucous wall which gives a direct effect in the form of irritation and inflammation that produces fibrosis in the pungtum and canalicular system. Fibrosis that occurs in the mucous wall in the lacrimal system is thought to be secondary to the systemic effects of the drug.5-7 Blockages can be partial (partial) or total. Canalicular stenosis is a disorder the lacrimal system that occurs in almost more than 50% of KPD patients treated with docetaxel

2.3 Epiphora and Kanalikular Stenosis

Epiphora (watery eyes) is one of the symptoms of canalcular stenosis that is most often complained of by patients. This abnormality is characterized by complaints of patients who complain of impaired vision due to watery eyes and can be diagnosed by performing a tear duct examination with a schirmer test to evaluate tear and probing production to locate the obstruction of the lacrimal

system. There are several studies that state that these abnormalities are followed by degenerative changes that can only be detected by invasive histological and biochemical examinations. One very confusing thing is the persistent epiphora complaint in patients with breast cancer (KPD) that has been observed in KPD patients treated with the docetaxel chemotherapy agent against the tear excretion system. In patients with KPD with good docetaxel therapy in the form of 1 week and 3 weeks, epiphora complaints were found. the results of the removal of the chemotherapy drug docetaxel are excreted through the tear drainage system which causes the accumulation of cell lymphocytes and plasma cells which cause inflammation, resulting in cell death and disruption of the canalicular mucosa. The mucosal wall in the canalicular tract experiences inflammation and adhesions after exposure to the docetaxel drug and makes fibrotic occurrence cause canalicular stenosis in KPD patients. 5-7

Potential mechanisms that are thought to be the cause of epiphora in patients with KPD include progressive keratin buildup and ulceration of the mucous wall resulting in thickening of the mucosal epithelium. Damage and disruption of the excretory system in especially canalicular tears results in disruption of the discharge flow of tears which causes complaints of epiphora (excessive tear release). 5-7

2.4 Classification of Canalicular and Epiphoric Stenosis

Canalicular stenosis 5

0 there is no canalicular stenosis

1 Mild canalicular stenosis, small retinal size but Probing can be done after widening the breast and probing produces bony Stop

2 Moderate stenosis, canalicula can only be partially probed, and probing Not obtained bony stop, pain when inserting probing

3 Severe stenosis, canaliculi cannot be probed, when probing is felt severe pain or blood is obtained the tear excretion system is not patented both the upper and lower channels.

Epiphora is divided into: 5

0 epiphora is not obtained

1 epiphora is mild with complaints often wiping tears

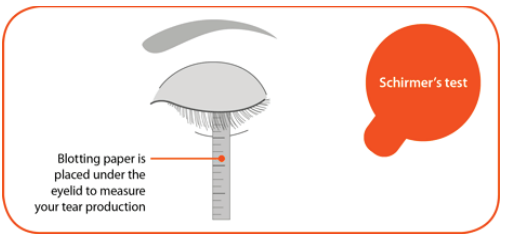
2 epiphora is being obtained by complaining of tears all day

3 obtained severe epiphora with severe epiphorous complaints that require patients to wipe away tears all the time and disrupt the patient's daily activities, such as reading, driving a car and doing daily activities

2.5. Diagnosis

To make a diagnosis of abnormalities in the lacrimal system history, physical examination, and investigations are needed. Some physical examinations carried out aim to determine the presence or absence of obstruction and the location and cause of interference with the lacrimal system. The examination used to check for the presence of eye disorders, namely epiphora is the Schirmer test. This check uses 2% fluorescein dye as an indicator. While to check the location of the obstructions, probing tests can be used. 9-11

Schirmer Test uses sheets of filter paper strips placed on the inner eyelids for several minutes. Both eyes are tested at the same time. The eyes are closed for 5 minutes and then the paper is examined for results. The paper will be wet and measured by the length of the wet paper. The result is about 15 mm on each sheet of paper. Because of the reduction in tear production (hipolakrimasi) in the



physiological process of aging, in the parents the results will only be around 10 mm for 5 minutes.9,10

Image 1. Schirmer Test

Quoted from: http://visionsource-eyesforlife.com

Probing test aims to determine the location of obstruction in the tear excretion channel by inserting the Bowman probe through the lacrimal system anatomy into the tear duct. In this test, the lacrimal tube is dilated with a dilatator, then the probe is inserted into the lacrimal sac. this examination can distinguish the location of the blockage in the pre-sac or post-lacrimal sac, which is based on the prisoner obtained. If a probe that can enter more than 8 mm in length means the canal is normal, but if the one entering less than 8 mm means there is an obstruction.7,12

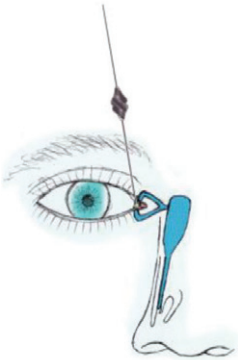


Image 2: Dilator insertion in the vertical position

Quoted from: emedicine.medscape.com

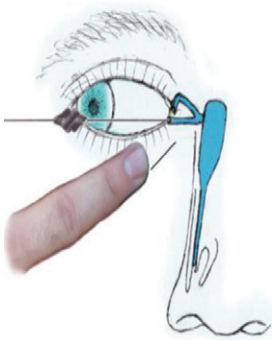


Image 3: Dilator insertion in the horizontal position

Quoted from: emedicine.medscape.com

Investigation also has an important role in establishing a diagnosis of dacryocystitis. CT scans are very useful for finding out the cause of obstruction in dacryocystitis mainly due to the presence of a mass or malignancy. Dacryocystography (DCG) and dacryoscintigraphy are very useful for detecting anatomic abnormalities in the lacrimal drainage system. 9-12

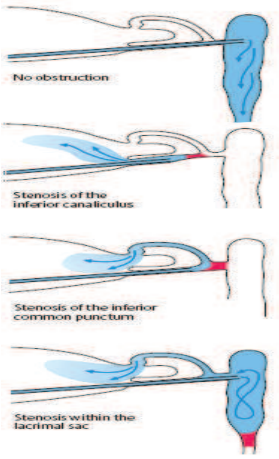


Image 4. Probing test

Quotes from Lang G, 2006. Ophthalmology, A Pocket Textbook Atlas. New York: Thieme; 2nd Ed.

2.6. Docetaxel

Docetaxel is a neoplastic agent originating from the taxoid family, the initial semisynthetic preparations extracted from yew plants. The chemical name docetaxel is (2R, 35) N-carboxy-3-phenylisoserine, N-tert-butyl ester, 13-ester with 5β-20-epoxy-1,2α, 4,7β, 10β, 13α-hexadroxytax-11-en -9-one-4-acetate-2bencoate, trihydrate. Docetaxel has the form of powder of 861.9 specific gravity and is soluble in water.15-17 Docetaxel has a structure:

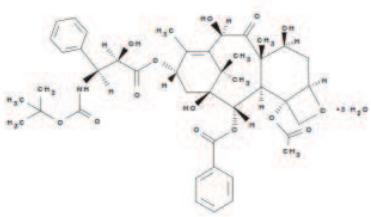
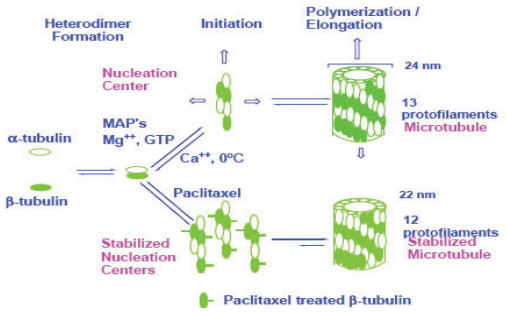


Image 5: Docetaxel structure

Quoted from: Ojima, I., Miller, M. Chemistry and Chemical Biology of Taxane Anticancer Agents. The Chem. Rec. 2001, 1, 195-211 ...

Clinical Pharmacology

Docetaxel is an antineoplastic agent that acts with the micro tubular tissue inside the cell which functions to process mitosis and interphase. Docetaxel is a free tubulin free and encouraging production into stable micro-tubulin while inhibiting its demolition. This results in a malfunctioning microtubule bundle and for microtubule stabilization, which causes inhibition of mitosis in the cell.



Docetaxel which is not the amount of protofilament microtubules, a feature that is very different from other neoplastic drugs in clinical use. 18,19

Image 6: Microtubule formation and the mechanism of action of

paclitaxel and docetaxel.

Quoted from: Ojima, I., Miller, M. Chemistry and Chemical Biology of Taxane Anticancer Agents. The Chem. Rec. 2001, 1, 195-211.

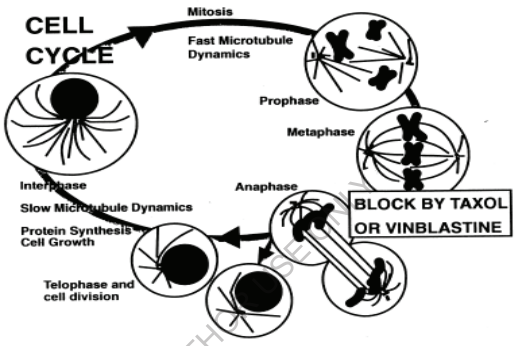


Image 7: Mitotic arrest induced by paclitaxel and docetaxel

between prophecy and anaphase.

Quoted from: G. I., Boge, T. C., Cheruvallath, Z. S., Clowers, J. S., Harriman, G. C. B., Hepperle, M., Park, H. The medicinal chemistry of taxol. Taxol: Science and Applications, 1995, 317-375.

2.7 Management of Epiphora and Kanalikuli Stenosis

In a prospective and observational study, Epifora was seen 39% -64% in patients with KPD who were treated with docetaxel chemotherapy agents. In this prospective and observational study, epiphora is a symptom arising from abnormalities in the lacrimal system anatomy, namely canalicular stenosis. The study also confirms the use of topical eye drops and probing and irrigation therapy

carried out by professional staff who can periodically cure and reduce these symptoms.

2.7.1 Topical treatment

Topical treatment using steroids is the management of canalicular stenosis caused by the chemotherapy agent docetaxel. The physiological mechanism of wound healing can occur as follows: 19,20

1. Disorders of epithelial and endothelial cells begin the anti-fibrinolytic cascade, temporarily as a response to healing of the affected tissue.

2. Inflammation; Inflammatory cells and circulating fibrocytes are recruited to the site of injury through gradient chemokines, supplying fibroblast-activating cytokines and growth factors. Neo-vascularization provides access to damaged areas and inflammatory, anti-inflammatory, and phagocytic cell flows.

3. Fibroblasts contract and reduce the size of the wound. Inflammatory cells and myofibroblasts undergo apoptosis, stop collagen deposition, and are cleared by phagocytic cells. Epithelial and endothelial cells are replaced and tissue architecture is restored.

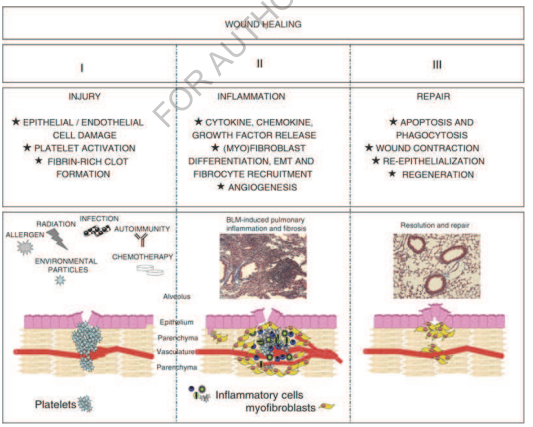


Image 8: Phases of wound healing

Quoted from: https://www.researchgate.net

Steroids

Steroids are lipophilic molecules derived from endogenous cortisol hormones that spread to cells, then bind and activate glucocorticoid receptors (GRs) which are activated and diffuse into the nucleus, where they can push or inhibit gene transcription by binding to glucocorticoid response elements present in the promoter region of the gene targets Cortisol structural changes can affect backbone disorders in corticosteroids with varying tissue distribution, hepatic metabolic rate, and affinity for GR.18-20

Steroids have been shown to affect all wound healing processes, which are divided into 3 phases, namely: inflammation, proliferative, and remodeling. In fact, these three phases overlap significantly, the cascade starts in 1 phase which can affect cell growth and differentiation in the next phase.20

Inflammation phase.

When a wound occurs, platelets and the coagulation cascade begin primary and secondary hemostasis. During primary hemostasis, platelets release many cytokines, including changing the growth factor-ß (TGF-ß), which triggers the subsequent production of additional growth factors, such as Factor 2 fibroblast growth, from the closest cell. Fibrin formed during secondary hemostasis acts as a reservoir for growth factors and provides a matrix for future tissue deposition. In addition, bound cellular membrane receptors, such as the intercellular adhesion molecule 1 (ICAM-1), facilitate the formation of inflammatory cells. Within minutes of injury, neutrophils arrive. Then, for 2 to 3 days, macrophages become numerous and dominate. Treatment with dexamethasone corticosteroids decreases cytokine expression, including TGF-b1, platelet growth factors, tumor necrosis factors, and interleukin-1a in injured tissue thereby reducing chemotactic and mitogenic stimuli for other inflammatory cells.20

Proliferative phase

Platelets and macrophages from the inflammatory phase form growth factors and cytokines which enable the process of angiogenesis, fibrosplasia, and reepithelization during the proliferative phase. Then followed by the formation of the extracellular matrix and new blood vessels, epithelial cells from the basal layer migrate across the basal lamina. Re-epithelialization, stimulated by keratinocyte growth factor (KGF), Depends on plasmin and matrix metalloproteinases to digest fibrin clots. Corticosteroids reduce TGF-β levels and expression of mesenchymal cells from keratinocyte growth factor (KGF), which weakens fibroblast proliferation and damages epithelialized tissue injury.20

Re-modeling phase

During the remodeling process, the wound tissue contracts and changes the pattern of expression of collagen. Myofibroblasts facilitate wound contraction through stimulation of TGF-ß1. Collagen modeling requires collagen digestion and switching from type III collagen to type I collagen. Animal studies have shown that corticosteroids interfere with collagen circulation, interfere with dermal-epidermal junctional interactions, and reduce the elasticity of wound strength by reducing accumulation of collagen and inhibiting fibrosis.

Sodium Hyaluronate Eye Drops

The wound healing process consists of various components, one of which is restoration through collagen synthesis. Collagen provides strength and integrity of all tissues, repaired by cross-linking and deposition of collagen. The strength of wound healing is generally recognized as a reflection of the degree of improvement in wound repair involving reorganization, migration and proliferation of epithelial cells. It has been reported that epidermal growth factor (EGF) facilitates repair of wounds by increasing cell migration and mitosis. 21

Epidermal growth factor (EGF), in the form of solution, increases cell accumulation of granulation and collagen tissue and contributes to wound healing.

Like most other peptides, EGF is not stable in physiological fluids and has a very short time. EGF in the form of a solution is diluted and can wash the surface of the eye. In addition, it is hypothesized that high concentrations of Epidermal growth factor (EGF) can induce receptor resistance, and produce a therapeutic effect. On the other hand, low-dose epidermal growth factor (EGF) treatment for a long time can improve wound healing.21

Bita Esmaeli (2006) and B. Leyssens (2009) reported that recovery of canalicular structure and function after administration of artificial tear drops had no serious side effects in patients with canalicular stenosis which was carried out probing and administration of artificial tear medication even though the drug was given in long period of time.21

2.7.3. Canalicular stents

The use of the first stent was described by Graue (1932, using silver wire), followed by Henderson (1950, polyethylene) and Veir (1962, easily formed metal rods). Since then, various materials such as silk, nylon, dacron and Polypropylene have been used and to create stents with better retention with minimal side effects. 21,22

Ideally the stent must have all of the following properties: the outer surface is inert, soft, smooth on the surface, and inexpensive / affordable, easy to get, easy to use and should not cause mechanical damage to the surrounding soft tissues. Silicon was introduced in 1968 by Keith, having the most desirable properties above and is mainly used today. Then, Quickert & Dryden (1970) and Crawford (1977) improvised this intubation device and reported significant success with bikanalikular stents. Bruno Fayet (1989) and Ruban (1995) modified this stent to be a monocellular device and in 1998, namely bikanalikular Ritleng. 21-23

The mechanism of stent action (canalicular intubation tool) 22,24

a. Functional: Tears can flow along the surface of the stent and reduce damage to the canalicular mucosa

Canalicular stenosis caused by inflammatory processes in the mucosa of canalicular causing thickening of the squamous epithelium, subsequently parakeratosis and hyperkeratosis of the squamous epithelium. The aim of this study was to assess the effects of sodium hyaluronate compared with steroid eye drop against the degree of canalicular stenosis in breast cancer patients treated with docetaxel chemotherapeutic agents. This study was a clinical trial with the randomized controlled trial (RCT) of 80 sample during the period August-October 2017. Bivariate analyzes used chi-square and McNemar test, and multivariate analysis used logistic regression with the backward method. A total of 20 samples with moderate degree stenosis became mild degree and 36 samples with mild degree stenosis became not stenosis after treated with sodium hyaluronate eye drops. A total of 16 samples with moderate degree stenosis became mild degree and 36 samples with mild degree stenosis became not stenosis after treated with steroid eye drops.

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Canalicular stenosis in breast cancer patients treated with doxetacel

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CHAPTER I

PRELIMINARY

1.1 Background

The lacrimal system consists of two parts, namely the secretion system in the form of the lacrimal gland and excretion system which consists of the lacrimal spinal, lacrimal canalicular, lacrimal sac, nasolacrimal duct, and inferior meatus. The lacrimal excretion system tends to be easily infected and inflamed for various reasons, one of which is the use of chemotherapy drugs in patients suffering from cancer. The mucous membrane in this canal consists of two intersecting surfaces, namely the conjunctival mucosa and the nasal mucosa which, in the event of a trade, can cause adhesions to the tear canal called canalicular stenosis which can cause eye disorders such as epiphora (tear discharge excessive) .1,2

Canalicular stenosis is one of the complications of the use of the docetaxel chemotherapy agent that is often found and used in the treatment of breast cancer patients and is a major cause of epiphora (disruption of excessive tear secretion) in breast cancer patients (KPD) treated with docetaxel chemotherapy agents. Epiphora as a side effect of docetaxel therapy was first described in the 2001 journal Ophthalmology. Since then several related reports have emerged, reported epiphora complaints appear in 64% of patients on weekly therapy and 39% of patients on therapy every 3 weeks, more than 50% patients on weekly docetaxel therapy have reported epiphoric symptoms and symptoms usually do not complete after chemotherapy therapy is complete. In the study of B. Esmaeli et al, the results showed that there was a disturbance in the tear drainage system, such as canalicular stenosis and pungent stenosis.

Breast cancer is a cancer with the highest prevalence in Indonesia in 2013. At present there is an estimated increase in the last 10 years the number of breast cancer patients from all parts of the world. Data (IARC) GLOBOCAN in 2012 noted that 1.7 million women diagnosed with breast cancer or around 11.9 percent of all cancer incidence, while WHO showed the prevalence of breast cancer throughout the world reached 6.3 million by the end of 2012 spread in 140 countries. 4

Docetaxel (Taxotere®) is a family of taxidoid chemotherapy agents. Paclitaxel (Taxol®, Docetaxel extracted from the bark of a yew tree). Taxidoid drugs work against cancer by interfering with the mitosis process. The American Cancer Society, Food and Drug Administration (FDA) has confirmed the benefits of docetaxel for use as chemotherapeutic agents in breast cancer patients who have undergone metastasis or as adjuvant therapy in patients with breast cancer (KPD). 5 Docetaxel acts by binding to microtubules and preventing them from being disassembled , by disrupting cell activity in the process of mitosis, cell division cannot occur and the cell will eventually die.4 Based on the study of Bita Esmaeli MD et all, docetaxel secreted in the tears and gives a direct effect on the canalicular mucosa causing inflammation and fibrosis in the retinal system and canalicular. Mucosal fibrosis in the lacrimal system occurs secondary to the systemic effects of the drug. 1,2,5 Exposure of excess tears (epiphora) is a reported side effect related to the use of the docetaxel chemotherapy agent, but to date only a small amount of data has been obtained about the effects ocular side, in the form of epiphora in a large study that had been carried out docetaxel-based adjuvant phase III reported the presence of ocular disorders related to docetaxel. In the 001 trial of the Breast Cancer International Research Group (BCIRG), lacrimal disorders were reported to be around 11.3% compared to 7.1% of patients receiving other chemotherapeutic agents such as fluorouracil / doxo-rubicin / cyclophosphamide. 1,3,5

Canalicular stenosis was found in breast cancer patients (KPD) who were treated using the docetaxel chemotherapy agent. Degree of more severe canalicular stenosis was found in patients with breast cancer (KPD) who were treated with docetaxel for a long time, especially in patients treated weekly with docetaxel. Fibrosis of the canalicular mucosa is the main cause of disruption in the tear canal. As a result of the mucosal area that occurs in inflammation, cytokines and growth factors-ß (TGF-ß) will be released, thus spurring the process of angiogenesis, fibrosplasia, and reepithelization. Several studies have shown that probing and administration of sodium hyaluronate eye drops and steroid eye drops have been shown to be effective in reducing the risk of complications in the tear drainage system, namely canalicular stenosis which can cause epiphoric complaints. 5.6

Probing test aims to determine the obstruction of the tear excretion channel by inserting a probe into the tear duct. In this test, the lacrimal tube is dilated with

2.7 Theoretical Concept