



# Postoperative pain inhibition by preoperative methylprednisolone in open cholecystectomy with the assessment of IL-6 and PGE<sub>2</sub>

Suwarman and Hendro Sudjono Yuwono\*

\*Correspondence: [hsyabc47@gmail.com](mailto:hsyabc47@gmail.com)



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School of Medicine, Padjadjaran University, Bandung, Indonesia.

## Abstract

**Background:** Open cholecystectomy is an operation which is often carried out with the aim of removing the gallbladder. In this operation an incision was performed along a 10-15 cm line in the right subcostal or midline area under the epigastric area. Here postoperative pain is a common problem that must be taken into consideration. PGE<sub>2</sub> and IL-6 are the predominant cytokines that are released after trauma from surgery and associated with inflammation of pain. Methylprednisolone is a glucocorticoid that has been reported to reduce postoperative pain in addition to inhibiting hyperalgesia of inflammatory mediator IL-6 and PGE<sub>2</sub>.

**Material and methods:** The level of pain was assessed during the 1st hour of surgery, the 2<sup>nd</sup>, 4<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup> and 24<sup>th</sup> hour consecutively. 125 mg of methylprednisolone was injected intravenously 60 minutes before the operation and 30 minutes before completing the skin sutures. For Group I: methylprednisolone was given postoperatively; Group II: methylprednisolone was given before surgery; and for Group III, the Control Group. Each Group number included a sample of 10 patients with the following inclusion criteria: ASA clinical classification I-II, age 20-60 years.

**Results:** The study showed that the treatment reduced postoperative IL-6 levels significantly ( $p=0.0000$ ), except in the 24<sup>th</sup> hour ( $p=0.4999$ ). The postoperative PGE<sub>2</sub> was not significantly changed ( $p>0.05$ ).

**Conclusion:** The levels of IL-6 in open cholecystectomy that were given methylprednisolone intravenously preoperatively were lower than given postoperatively, but were not reduced for the PGE<sub>2</sub> level. Methylprednisolone administered intravenously before open cholecystectomy is able to decrease postoperative pain.

**Keywords:** Methylprednisolone, open cholecystectomy, IL-6, PGE<sub>2</sub>

## Introduction

Postoperative pain occurs after open cholecystectomy. The pain is caused by stimulation of sensory nerves in injured soft tissue, particularly in the area where the skin incision occurs. The inflammatory pain occurs due to tissue damage that causes an inflammatory response caused by the release of a local mediator with systemic effect [1]. These mediators include IL-6 and PGE<sub>2</sub> [1,2]. The presence of inflammatory mediators contributed to the occurrence of postoperative pain. Methylprednisolone has the effect of inhibiting the formation of pro-inflammatory cytokines production by macrophages and mast cells, which then prevents cyclooxygenase from occurring [3]. Formation of cyclooxygenase leads to changes in arachidonic acid and to prostaglandins, which then prevents painful stimuli from occurring [3]. Are there differences in the levels of PGE<sub>2</sub> and

IL-6 after open cholecystectomy surgery among patients given intravenous methylprednisolone before and after surgery?

## Materials and methods

### Patients

Patients were those undergoing open cholecystectomy surgery, ASA clinical classification I-II, age 20-60 years. We exclude patients with chronic pain, females with positive pregnancy test results, anyone taking long-term glucocorticoid, people with drug hypersensitivities to methylprednisolone, patients with diabetes mellitus, and those who would undergo cholecystectomy surgery that would last for more than 4 hours.

### Ethical clearance

This clinical trial has been approved by the Research Ethics