

CHAPTER VI

DISCUSSION, CONCLUSION AND RECOMMENDATION

6.1 Discussion

Laparoscopic cholecystectomy is the procedure of choice for the treatment of symptomatic gallstones. TPC is routinely used to create the operative space in laparoscopic surgery. Many reports mentioned the hazards of increased intraabdominal pressure and absorption of CO₂, which may occur from TPC. AWL was introduced to laparoscopic surgery in 1992. It was used for creation of operative space, instead of TPC. However, its real benefits have not yet been proved due to lacking of clinical trials in this topic. This study was designed to evaluate the clinical benefits of AWL as compare to TPC in laparoscopic cholecystectomy.

Success Rate : Success rate was the main outcome of this study. Failure of the surgical procedure or conversion to another procedure brings more tissue trauma, use more operative time, more patient's expense and finally more morbidity. AWL is considered as a safer procedure than TPC. The rate of success within ten percent was acceptable as an equivalent success rate.

The result from this study showed that the success rate of TPC group was 95.2 per cent while success rate of AWL was 66.7%. The effect size was 28 per cent. The sample size of 84 patients was enough to demonstrate the statistical significant difference of the main outcome. Estimation by SamplePower program (SPSS Inc.), the power for the test of the null hypothesis was 92 per cent. Precision for the observed difference of 28 per cent was reported with 95 % confidence interval between 0.15 to 0.41.

High conversion rate after AWL in gynecologic surgery was also reported in the recent studies^(70,71)

The success rate of 95.2 percent was as equal as the over all success rate in previous report of our study⁽¹⁰⁾. The experience with TPC technique might have some effect in the study. The conversion in first half (21 patients) of AWL group was 9 while only 5 patients in AWL group were converted to TPC and open cholecystectomy in the second half of the study. However experience was not the entire reasons for the failure in AWL group. The major cause was poor exposure by AWL technique. All 9 cases, which the reason for conversion was “poor exposure”, were successfully operated when converted to TPC technique. The other cause of conversion was fibrotic gallbladder and marked adhesion from previous cholecystitis. Four out of 5 patients in AWL were managed by open surgery, laparoscopic cholecystectomy with TPC could managed successfully only in 1 patient of this subgroup.

The exposure in TPC group was better than the AWL group, no case in TPC group was converted by “poor exposure” reason. The reasons for conversion in TPC

group were sidewall injury to CBD in 1 patient and marked adhesion to duodenum in the other patient. This adhesion was found to be a cholecysto-duodenal fistula after conversion to open surgery.

Operative time

The surgeons made their best effort to finish the assigned operation without limit of time. The surgeons spent less average time to perform laparoscopic cholecystectomy with TPC technique 64.6 ± 24.1 minutes, compare to AWL, 104.0 ± 32.2 minutes, respectively. The operative time was significantly longer in the AWL group. ($p < 0.001$). To analyze the details of time spent, we divided operative time into preparation, dissection and closure time. The surgeons spent more time in all three periods of the operation in AWL group.

In AWL group, the preparation time was longer, because the operator had to apply the device for abdominal wall lifting and spent more time to introduce trochars into the non distended abdomen. The dissection time was longer, because of the poorer exposure and smaller operative space provided by AWL technique. The AWL group used more trochars than the TPC group, and the closure time was significantly longer..

Complication rate

The complication rate in this study was 4.8 percent (2 in each group). The complications were sidewall CBD injury and bronchospasm in TPC group, and wound infection and pneumonia in AWL group. The complication rate was as same as other studies.

Cardiac arrhythmia rate.

There were 4 patients in each group (9.5%) who had PVC during the operation. There was no other type of cardiac arrhythmia. Somboonviboon W.⁽⁷²⁾ found 16 per cent of PVC and 2 percent of premature atrial contraction in previous study. End tidal CO₂ was significantly higher in the TPC group than AWL group $p=0.001$, but no patient developed hypercarbia. The anesthesiologist can correct hypercarbia by increase ventilatory rate and tidal volume. The adverse effects of CO₂ absorption could not be demonstrated in this study.

Postoperative pain

Pain is a subjective symptom and difficult to measure. Visual analog scale was used to evaluate postoperative pain at 6 and 24 hour postoperative period. To prevent bias, a large bandage was used to cover the operative wound. A research nurse came to ask the pain score at 6th and 24th hour.

The medications, which the patient received during the operation, were washed out and the patient was alert enough to communicate with the evaluator at 6 postoperative hour. Usually the patients did not receive any analgesics before evaluation at 6 hour. In case that the patient had severe pain before 6 postoperative hour, the research nurse evaluated for pain score at that time and gave her a dose of analgesics.

There was no statistical significant difference between the two groups at 6 and 24 postoperative hour. Pain score at 24 postoperative hour was decrease significantly as compare to at 6 postoperative hour, $p= 0.001$

In spite of more trochar wounds in AWL group, pain score at 6 and 24 hour was not significantly difference from TPC group.

Shoulder pain was usually a dull and annoying pain, so it was measured as a dichotomous response. The pain was higher in TPC group, but significant difference could not be demonstrated at the sample size of 84 patients.

Postoperative hospital stay

Postoperative hospital stay was used instead of total hospital stay, because patients had to wait for investigation in uncertain pre-operative days. The postoperative stay of AWL group was longer than TPC group, but no statistical significant difference.

Costs

Costs of the two procedures were evaluated in both patient's and provider's perspective. For the patient's perspective, as a government hospital, fixed operative fee was charged to the patient even the procedure was converted into open surgery. The system of charging was different between government and private hospital. However the cost per successful case in AWL group was higher than TPC group in the patient's perspective. For provider's perspective the cost per successful case of AWL group was also higher than TPC group. (24,613.55 vs. 15,499.14 Baht)

6.2 Conclusion

Theoretically during the laparoscopic cholecystectomy, tension pneumoperitoneum with CO₂ has potential hazards in hemodynamic and neuroendocrine responses due to mechanical effect of increased intraabdominal pressure and from absorption of carbon dioxide gas into systemic circulation. The potential hazards maybe diminished or eliminated by abdominal wall lifting technique. From this randomized controlled study, the clinical benefits of AWL technique in hemodynamic stability was not demonstrated. In the other hand, the benefits of TPC were demonstrated clearly. TPC provided higher success rate, shorter operative time and more cost effectiveness in both patient's and provider's perspective.

6.3 Recommendation

From the results of this study, the conventional (pneumoperitoneum) laparoscopic cholecystectomy should be used for the treatment of symptomatic gallstones, with awareness of its potential hazards. Precaution techniques for the complications should be strictly followed and early detection of the complications is mandatory.

Abdominal wall lifting in laparoscopic surgery may be of benefit for the patient with compromised cardiovascular system who may suffer complications from increased intraabdominal pressure and hypercarbia.