# Anaesthetic Management of a Laparoscopic Pancreatico-Duodenectomy - Case report

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## ABSTRACT

A pancreatoduodenectomy involves the removal of a tumour of the peri ampullary region and head of the pancreas. It is a technically difficult procedure requiring experienced anaesthesia and surgical teams. We report the peri-operative management of a patient undergoing laparoscopic pancreaticoduodenectomy.

***Key words:*** laparoscopic, whipple, pancreatico-duodenectomy, anaesthesia, epidural

## INTRODUCTION

Whipple procedure or pancreatico-duodenectomy is the surgical treatment of choice for carcinoma of the peri ampullary region and head of pancreas. The open procedure is associated with considerable morbidity and occasional mortality (1). Recently, laparoscopic pancreatico-duodenectomy has started to gain wider acceptance as surgeons become more comfortable with laparoscopic technology and skills. The anesthetist plays a key role in peri operative management and can significantly influence patient outcome. Epidural analgesia, prevention of hypothermia, careful fluid balance, close intra and post operative monitoring are key strategies that improves outcome of these patients (2).

## CASE REPORT

A 53 year old lady presented with obstructive jaundice and examination revealed a palpable gallbladder. The patient was a diabetic for the last 10 years. A contrast enhanced computed tomography (CT) scan revealed dilatation of the intra and extra hepatic biliary ducts with a carcinoma of the head of the pancreas, which was confirmed by Magnetic Resonance Cholangio Pancreatography (MRCP). The patient was scheduled for laparoscopic Whipple procedure.

Pre operative laboratory findings included a haemoglobin level of 12g/dl, platelet count of 235×109, INR of 0.86, bilirubin of 88umol/l, AST of 67 IU/l, alkaline phosphatase of 291 IU/l, normal renal function and serum electrolytes. On the day of the surgery blood sugar was 7.8mmol/l. Echocardiography revealed sclerosis of the mitral valve, functional mitral regurgitation and ejection fraction of 60%, mild obstruction in lung function test, FEV1>80%. ECG revealed no significant changes.

Pre operative vital signs were as follows; blood pressure, 107/54 mmHg, pulse rate 116 bpm, oxygen saturation of 98% while breathing room air. Lungs and airway assessment were clinically normal. Anaesthetic plan of general anaesthesia with epidural analgesia was explained and consent

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was taken. Patient was minimally fasted and hydrated adequately over night. Standard monitoring of vital signs was started in the theatre, epidural catheter was inserted at T8 -T9 level. After pre oxygenation with 100% oxygen, general anaesthesia was induced with 100ug of fentanyl, 150 mg propofol, 40 mg of atracurium. The patient was intubated with 7.5 cuff endotracheal tube. Tube placement was confirmed and a nasogastric tube was inserted to decompress the stomach. Co-amoxiclave 1.2g and morphine 6mg was given before starting the procedure. General anaesthesia was maintained with 1.2-1.5% Isofluraine in 50% oxygen and air. A 16F, 18F, 18F, 3-lumen central line was inserted in the right internal jugular vein and a 20gauge arterial line was inserted in the left radial artery. A forced air warming blanket at 43°C was used. All fluids were heated using a fluid warming device. The urine output was measured via an indwelling urinary catheter.

The patient was placed in reverse-Trendelenburg 20 degrees and rotated to the left by 30 degrees with legs abducted to 60 degrees. Pneumoperitoneum was created after 30 minutes of induction, $CO_2$ was insufflated at pressure of 14 mmHg. After creating the pnumopertonium central venous pressure rose from 9cm $H_20$ to 16cm$H_20$, peak airway pressure from 16mmHg to 27mmHg, $ETCO_2$ from 28mmHg TO 39mmHg. Ventilation was adjusted to maintain the $ETCO_2$ between 35-40mmHg and peak airway pressure was kept below 30mmHg. There was a drop of 3cm $H_20$ CVP and 5mmHg airway pressure after releasing the pnumopertonium. Serial glucose measurements remained between 163 and 230 mg/dL and did not require pharmacologic intervention.

The patient was haemodynamicly stable through out the surgery. Mean arterial blood pressure was maintained between 70mmHg to 80mmHg. Urine out put remained more than 0.5ml/kg hour(total of 400ml) with slight reduction during the period of pnumopertonium. Ringer's lactate 2000ml, hetarstarch 200 ml and 450ml of fresh frozen plasma were used during the procedure. The time for resection was 390 minutes with a blood loss of 400ml.Total amount of $CO_2$ used was 498 liters. Repeated arterial blood gas measurements showed good oxygenation, adequate control of $PaCO_2$ and minimal metabolic derangements (PH, $K^+$, $Na^+$, Lactate).

Epidural was top up with 10ml of 0.1% bupivacaine with 2ug ml fentanyl before leaving the theatre. Patient was transferred to the ICU and haemo-dynamicaly stable over night. The patient was extubated and epidural analgesia was continued during the ICU stay. Octeotride 250ug 8 hourly subcutaneous dose was started. The patient required a minimum amount of morphine during her ICU stay and sent to the ward on post operative day 4, discarded from the hospital on day 10.

## DISCUSSION

Pancreatic tumour is one of the commonest cause of cancer related deaths (4). Currently, the only curative treatment for pancreatic cancer is surgical resection (4). Whipple procedure, or pancreatico-duodenectomy is one of the technically challenging major abdominal procedure occasionally results in increase morbidity

and mortality(4). Due to the advanced age, associated co morbidities and complexity of the surgery, both surgeon and anaesthesiologist play a crucial role in peri operative evaluation and management. These patients are referred early to tertiary care centres where multidisciplinary team involvement is available.

Most striking clinical symptom in these patient is painless jaundice. Ultra sound scan is the first line imaging test and has a sensitivity of more than 90% of site of the obstruction. Dilatation of the common bile duct and pancreatic duct are seen in patients with a pancreatic head tumour. CT and MRI scan have high sensitivity of detecting small tumours. Magnetic Resonance Cholangio pancreatography provides detail imaging of hepatobiliary and pancreatic systems(4).

Despite current developments in operative techniques and postoperative care, pancreatic surgery is associated with high morbidity and mortality. Potential complications and information about the therapeutic procedures and recovery should be informed to patient. According to the current evidence, routine use of long acting preoperative anxiolytics, optimisation of nutrition in malnourished have shown mild to moderate evidence (3). Association between renal disfunction and obstructive jaundice, is well established (5,6). Minimum fasting and adequate hydration during the perioperartve period reduce the incidence of renal failure (3).

Post operative mortality and morbidity depends on many factors. Cardio respiratory diseases are the most commonly observed co morbidities, age related medical problems an increasing incidence of diabetes decrease patients ability to respond to surgical stress. Insulin resistance and hyperglycaemia are strongly associated with post operative mortality and morbidity (3). Treatment of hyperglycaemia with intravenous insulin during the peri operative improves outcome but hypoglycaemia remains a risk (3).

Almost all Whipple procedures are done under general anaesthesia with or without epidural analgesia. In our unit thoracic epidural is routinely used for laparoscopic Whipple procedures. Evidence in epidural analgesia is limited in laparoscopic Whipple procedures, but it is superior to opioid only in accelerating the return of bowel functions and dietary intake while providing better pain relief (3). Timely administration of antibiotics reduces the surgical site infection and should be used in a single dose manner initiated 30-60 min before skin incision (13,14,15).

Serum bilirubin of this patient was four times of normal limit and the anaesthetists should be aware of the impact of the hyper bilirubinaemia on anaesthetic drugs. Prolong procedure, changing positions, pnumoperitonium and associated co morbidities make it necessary for close monitoring such as central vents pressure and intra arterial blood pressure.

Several meta-analyses and randomized control trials have demonstrated that preventing inadvertent hypothermia during major abdominal surgery reduces the prevalence of wound infections, cardiac complications, bleeding and transfusion requirements, as well as the duration of post anaesthetic recovery (16,17,18). Hence, the use of active warming is highly recommended to reduce postoperative morbidity and enhance recovery (16,17,18).

Laparoscopic procedure requires significantly less amount of fluids both

during and after the procedure. Excessive overload of salt and water in the peri operative period increases postoperative complication rates and delays the return of gastrointestinal function. (7,8,9). Near-zero fluid balance as well as avoiding overload of salt and water improves outcome. Perioperative monitoring of stroke volume with trans-oesophageal Doppler, LidCO to optimize cardiac output with fluid boluses improves outcomes (11). Balanced crystalloids should be preferred to 0.9% saline (12).

Close observation in the intensive care setting is mandatory to monitor for complications and provide adequate pain relief in early phase of the recovery. Somatostatin and its synthetic analogues (e.g., octreotide) reduce splanchnic blood flow and the release of pancreatic exocrine secretion (19).The rationale for its use is to reduce the risk of pancreatic anastomotic fistulas by decreasing the volume of pancreatic exocrine secretions. The most recent meta-analysis involved 17 trials with 1457 patients undergoing Whipple procedure and 686 undergoing distal or other resections. The authors concluded that the use of somatostatin analogues reduced the crude rate of pancreatic fistulas, but that the rate of clinically significant fistulas as well as the overall major morbidity and mortality remained unchanged (20).

## CONCLUSION

There is a significant development of laparoscopic surgical skills in the recent past. Laparoscopic pancreatico-duodenecomy is one of the technically challenging procedure. However, immediate post operative outcome has significantly improved with laparoscopic procedure. Multidisciplinary team approach, pre operative optimization and optimum intra, post operative management can minimize the associated complications in these procedures.

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Received: September 2017
Accepted: September 2017