Anaesthesia for a Postrenal Transplant Parturient Lady: A Case Report

Abdul Jabbar[1], Raihan Uddin[2], Mushfiqur Rahman[3], Kawsar Sarder[4], NN Chowdhury[5], M. Khalilur Rahman[6]

[1]Medical officer , Department of Anaesthesiology & SICU, BIRDEM, [2,3]Asisstant Professor, Department of Anaesthesiology & SICU, BIRDEM. [4,5,6]Professor, Department of Anaesthesiology & SICU, BIRDEM.

Corresponding author: Dr. Abdul Jabbar, E-mail: jabbardr32@gmail.com

Abstract

As the number of renal transplantation has grown, there has been an increase in the number of renal transplant patients giving birth. In our country, there was no data on obstetric anaesthesia management of such patients. Management of successful pregnancy on postrenal transplantation is a unique challenge to nephrologist, obstetrician, and anaesthesiologist. We present the anaesthetic management of one post transplant patient scheduled for cesarean section. Main goal of our anaesthetic management is to maintain optimum perfusion pressure of renal allograft to preserve its function and to reduce perioperative stress.

Keywords: *Anaesthesia, epidural anaesthesia , pregnancy, renal transplantation.*

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Introduction

Women with chronic renal failure (CRF) suffer from altered reproductive and sexual functions; hence, conception is rare for women on dialysis, the incidence being one in every 200 patients.[1] However, after successful renal transplantation, endocrine function improves rapidly and correlates closely with that of normal women of childbearing age.[1] These patients present a unique challenge to the obstetrician, nephrologist, and anaesthesiologist due to the presence of altered physiology and immune-suppressants.

We report the anaesthetic management of one parturients with renal transplantation who underwent delivery by cesarean section with good maternal and neonatal outcome.

Case Report

A 28-year-old woman with CRF due to chronic glomerulonephritis underwent renal transplantation abroad on 2008. After transplantation the graft function was well maintained on prednisone 5 mg/day, azathioprine 100 mg/day and tarcolimus1 mg/day. She was receiving nifedipine 20 mg twice a day for hypertension[7]. Three years after transplantation she got married and after 5 years she conceived. Regular follow-up was done and she develop gestational diabetes mellitus on the fourth month and now she was on regular insulin . Her pregnancy was uneventful with controlled hypertension and diabetes. At 37 weeks of gestation patient was schedule for elective cesarean section due to cephalo-pelvic disproportion after confirming fetal maturity.

Serial assessment of complete blood counts (CBC), renal function, platelet counts, liver function test, coagulation profile and ultrasonographic evaluation of the transplanted kidney and fetus were carried out.

She was explained about epidural anaesthesia and post operative analgesia in pre anaesthetic check up, her informed consent was obtained. On the night before surgery, she was given ranitidine 150 mg orally and in the morning Tab. Prednisolone(5mg), Tab. Azathioprine(100mg), Cap. Tacrolimus(0.5mg), Tab. Nifidipine 20 mg was given with sips of water[7]. Ranitidine 50 mg, ondansetron 8 mg, and hydrocortisone 100 mg were

given intravenously (IV) 30 min before surgery to prevent nausea, vomiting, and aspiration associated with pregnancy and immunosuppressant. Her intravenous channel was maintain with 500 ml of normal saline. Antibiotic prophylaxis was given. Adequate hemodynamic monitoring was provided in the form of noninvasive blood pressure (NIBP) monitoring, ECG, peripheral oxygen saturation (S_PO_2), and urine output.

In sitting position and sterile technique a 16 G epidural needle was inserted at L_{2-3} interspace. Later confirmation of epidural space was done on loss of resistance to injection of air technique. An 18G epidural catheter was introduced, 4cm kept within the epidural space. A test dose of 60 mg 2% lidocaine with adrenalin given to exclude intravenous and intrathecal administration of local anaesthetic. Patient shited to supine position and 15° left lateral tilt was maintained. Then 0.5% plain bupivacaine 60 mg(12 ml) with fentanyl 100 mcg(2ml) and 2% lidocaine 60mg (3ml) given in the epidural space. Immediately no hemodynamic alteration was found. Stage of surgical anaesthesia was achieved gradually and incision was given 20 min later. Blood pressure gradually decreased but no hypotension developed. A total of 1000 ml of 0.9%normal saline was administered. 20 U of oxytocin were given IV after childbirth. A 2.6-kg healthy male child with normal APGAR score was delivered. Postpartum course was smooth. Epidural analgesia was maintained in 0.125% of bupivacaine with fentanyl (2 µg/ml) @ 3-6 ml/hour in syringe pump for 24 h postoperatively to reduce the surgical stress rescue analgesia was maintained with pethidine75 mg deep intramuscularly. Pain was monitored and kept VAS less then 3. Postoperatively, hydrocortisone 100 mg was given 6 hourly for 24 h. all other medication were added as preoperative prescription .Epidural catheter was removed on 2nd postoperative day. Her postoperative course was uneventful. And she was discharged on 4th postoperative day.

Discussion

All post-transplant pregnancies should be considered as high risk and close monitoring by obstetrician and transplant physician is mandatory. Anaesthesiologists are involved in the care of these patients for both labor analgesia or for operative procedure. Anaesthetic considerations include:

- Effect of pregnancy on renal allograft;
- Side effects of immunosuppressive drugs in mother and fetus, relevant to anaesthesiologist;
- Interaction of immunosuppressants with anesthetic drugs and techniques.
- Give well monitored perioperative care.

Pregnancy does not appear to cause excessive or irreversible problems with graft dysfunction if the function of the transplanted organ was stable prior to pregnancy.[2]

The immunosuppressive drugs commonly used in renal transplantation are cyclosporine, tacrolimus, azathioprine, or mycofenolate mofetil and steroids. The important side effects of cyclosporine, generally seen with long-term use of these agents, are hypertension, hyperlipidemia, nephrotoxicity, neurotoxicity, and hepatotoxicity[3,4] .Vast majority of the patients are already hypertensive before the renal transplant and on medication for control of blood pressure. Hypertension is due to increase in systemic vascular resistance and calcium channel blockers are preferred for its treatment. Our patients was receiving oral nifedipine for control of blood pressure. Nephrotoxicity is the major complication of cyclosporine due to renal arteriolar vasoconstriction leading to reduction of glomerular filtration rate and creatinine clearance.[5] The drugs dependant on kidneys for elimination should be used with caution and nephrotoxins should be avoided in perioperative period. Thorough neurological examination is important in patients on cyclosporine as it contributes to tremors, seizures, and paresthesia. Documentation of paresthesia is important if regional anaesthesia is planned. Our patients had no neurological symptoms because of the immunosuppressive medication.

Newer immunosuppressive regimens, including tacrolimus, compare favorably with older regimens in reducing hypertension and pre-eclampsia in pregnancy.

The major complication of azathioprine and mycofenolate mofetil (MMF) is bone marrow suppression especially leucopenia [3,5]. So complete blood examination is necessary before surgery. In case if leucopenia was found which was corrected

preoperatively by parenteral and oral folinic acid. Preoperative liver function tests should be done as these drugs may cause elevation of liver enzymes.

Side effects of glucocorticoids are well documented and include sodium retention, hypertension, diabetes, peptic ulcer disease, cushing's syndrome, poor skin integrity, osteoporosis, and delayed wound healing. Care of patients includes gentle handling to prevent skin damage and fractures, antacid prophylaxis, and thorough airway examination[6] . acute adrenal insufficiency may precipitated by trauma or surgery ,so it was continued[8] .

Apart from side effects of immunosuppressants, exposure to anaesthesia and surgery alters many facets of immunocompetence. It depresses both T cell and B cell responsiveness as well as phagocytosis. Immunocompetence during surgery can be affected by direct and hormonal effect of anesthetic drugs, immunological consequences of other drugs used, type of surgery, and coincident infection. The incidence of postoperative infection is related to surgical trauma and to an associated release of cortisol and catecholamines that are known to inhibit phagocytosis. This hormonal response is mediated due to pain through the sympathetic nervous system. The attenuation of sympathetic nervous system stimulation is desirable during surgery. This can be done by giving regional anesthesia or by deepening the plane of GA and by inhibiting the stress response with the help of drugs.

The choice of anaesthetic technique depends on functional status of transplanted kidney, the cardiovascular status, hematological status, and indication of cesarean section. In absence of renal dysfunction, anaesthetic management is similar to that of a normal parturient, except for prophylactic antibiotic and stress dose of steroids in all patients with transplanted kidney.[5,6] Renal transplant recipients with functioning kidney grafts may have normal creatinine levels. However, glomerular filtration rate and effective plasma flow are likely to be low, and drugs excreted via kidney may have prolonged action. Strict aseptic precautions should be maintained during intravascular access, intubation or while performing regional techniques and the use of disposable anesthesia accessories is recommended. Central neuraxial blocks are not contraindicated in renal allograft recipients if coagulation status is normal.

Immunosuppressive drugs can affect the pharmacology of many anesthetic drugs. Cyclosporine tends to enhance pentobarbital anesthesia and fentanyl analgesia in mice by an unknown mechanism. Intraoperative management includes careful attention to sodium and magnesium levels and avoidance of hyperventilation which can be done by maintaining the $EtCO_2$ within the normal range.

Amongst inhalational agents, sevoflurane is safe. However enflurane should be avoided in patients with renal transplantation because of hepatotoxicity of fluoride metabolite. To maintain therapeutic levels, cyclosporine or tacrolimus should be given 4 hours before preoperatively because of reduced gastric emptying. Choice of nondepolarizing muscle relaxant depends on renal status of patient. However, the drug that relies least on renal elimination like atracurium is the choice. The solubility agent of cyclosporine (cremaphor) has been shown to augment the action of neuromuscular blocking agents [5]. Neuromuscular function should be monitored particularly if the patient is receiving magnesium. Clinically relevant dose of azathioprine do not antagonize neuromuscular blocking drugs in humans.

Meticulous perioperative fluid and electrolyte management is essential as hypotension may make the transplanted kidney susceptible to acute tubular necrosis. Special care must be taken to keep patient well hydrated and maintain urine output more than 1 ml/kg/h.

Postoperative pain relief is provided with narcotics and local anaesthetics by epidural or spinal route. Non steroidal anti-inflammatory drugs should be avoided as they increase the risk of gastrointestinal bleeding, reduce renal blood flow through prostaglandin inhibition and exacerbate cyclosporine toxicity.

In conclusion, a clear understanding of physiological changes on renal allograft by pregnancy, immunosuppressive and anaesthetic drugs contribute for safe management of parturient.

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