Regional Anaesthesia in Parturients with Valvular Heart Disease

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In the past, when patients with heart valve diseases needed anesthesia, general anesthesia was the technique of choice, mainly dictated by non-anesthesiologists, who gave their opinion as a cardiologist, internist, ... The devastating effects of hypotension due to the regional anesthesia sympathectomy, resulting in a decrease of systemic vascular resistance, preload and consequently coronary perfusion, were avoided by the anesthesiologist. Consequently very few publications appeared in the literature. Only bad outcome was published from time to time, related to case reports. Prospective randomized studies are not done, partly due to the low frequency of these heart valve diseases and partly because ethical issues also do arise.

In the 1980s a few case reports describe the difficulties seen in older (non-pregnant) patients with idiopathic hypertrophic subvalvular aortic stenosis (grade III), who had to undergo an operation for a femur fracture [1]. Spinal anesthesia (8 mg tetracaine + 100 μg fentanyl) resulted in severe hypotension, tachycardia and ST depressions, and the operation was cancelled. One week later the operative intervention was performed successfully under general anesthesia. Epidural anesthesia has a slower onset time, and consequently the patient may compensate better to a slower onset of the sympathetic block. This was the case in a 56-year-old patient [2], with idiopathic hypertrophic aortic stenosis (LVEDP 25 mmHg - peak systolic pressure LV-aorta 100 mm Hg), who underwent an herniorrhapsy under epidural anaesthesia (15 ml lidocaine 2%), resulting in an upper sensory block to Th10, hypotension (70/40 mm Hg) and bradycardia (20 bpm), with an adequate reaction on iv atropine 1.2 mg.

In 1987 Alderson [3], published a case in which a 36-year-old primigravida (aortic and mitral valve regurgitation and LVH - pre-eclampsia [proteinuria 6gr/24h – oedema – dyspnoea] - blood pressure 220/120 mm Hg) underwent a Caesarean Delivery under epidural anesthesia. Following a test dose (2 ml bupivacaine 0.5%), a bolus (18 ml bupivacaine 0.5%) resulted in hypotension, which was corrected with Hartmann Solution. An upper sensory level of Th4 was obtained, but no sacral anaesthesia. A further bolus (6 ml bupivacaine 0.5%) resulted in severe hypotension, not responding to fluid, vasopressor therapy, intubation, ventilation, cardiac massage. The baby survived a quick delivery, but the mother unfortunately died. The author concluded that epidural anesthesia for a Cesarean section is contraindicated in patients with severe heart valve diseases.

Perhaps this conclusion was drawn too early. In the 1990s, more knowledge was gained and better results were obtained in non-obstetric patients with heart valve diseases, by using a meticulous anesthesia technique, instituting gradually a regional block to the level requested, combined with
adequate monitoring. In patients with severe aortic valve stenosis, good results were obtained with continuous spinal anesthesia (five boluses of 2.5 mg bupivacaine in a 4 hour procedure) [4-5].

Several publications concerning obstetric patients were also published. Hemmings [5] described a 33-year-old primigravida with mitral valve regurgitation (grade III), who could safely be delivered under epidural anesthesia (12 hour partus with 130 mg bupivacaine). An epidural catheter was inserted at the L2-L3 lumbar interspace, and a low forceps was used, avoiding bearing down activities by the mother, as the latter showed a deterioration in haemodynamic function. Before the institution of the epidural, uterine contractions had haemodynamic consequences, which were not seen when the epidural block was in function.

Painful contractions and stress clearly stimulated the sympathetic outflow. A good outcome was obtained by a slow induction of the epidural block (no epinephrine), lateral position and left uterine displacement, avoiding bearing down and valsalva manoeuvres. Oxytocics need to be delivered with caution and a continuous infusion is preferable.

A combined spinal epidural anesthesia technique is also a promising technique in parturients with heart valve diseases. Van Helder [6] demonstrated that a 30-year-old primigravida with aortic valve stenosis (0.8 cm² - gradient 35 mm Hg) and a combined mitral-aortic valve regurgitation disease, underwent excellent anesthesia for both the trial of labor and the Cesarean delivery. Again incremental minute doses of local anaesthetics were used, the obtained results were evaluated carefully, an iv infusion of oxytocics was used, resulting in stable hemodynamics. During the trial of labor (7.5 hours) 30 ml bupivacaine 0.625% was used, while the 90 minute Cesarean section was performed using 15 ml lidocaine 2% in 5 ml increments, resulting in a Th 4 upper sensory block.

A 19-year-old primigravida [7] with a subaortic stenosis (IHSS + SAM systolic anterior motion of the mitral valve + grade I mitral valve regurgitation + left ventricular outflow tract gradient of 15 mm Hg) delivered her baby after a 13-hour duration of labor, with the help of a low forceps and a combined spinal-epidural anaesthesia technique (8 ml/hour bupivacaine 0.1% + fentanyl 2 µg/ml), resulting in an upper sensory level of Th 10. Oxytocine (40 IU) were administered over a period of 8 hours and no untoward haemodynamic effects were seen. Autore [8] described three women who underwent a successful Cesarean delivery with epidural catheters and incremental boluses of 4 ml lidocaine 2%. A total amount of 16 ml resulted in a T4-S5 block.

Editorials [9-10] appeared in Anaesthesia in 1998 supporting the use of regional anesthesia techniques in obstetric patients with heart valve diseases undergoing Cesarean deliveries. Severity of stenosis should not be a factor influencing the decision to use general or regional anesthesia. A perioperative anesthesia plan should be developed in each case. Only knowledgeable and experienced anaesthesiologists should take care of these patients. Junior staff needs proper training before they actually can handle safely these severe problematic cases.

Patients with heart valve problems who have to undergo an operation can be given regional anaesthesia, provided a meticulous anesthesia technique is used, time is taken to institute the
regional anesthesia block, using titration and minute amounts of local anesthetics to which opioids are added. A catheter technique (continuous spinal or a combined spinal epidural anaesthesia technique) is require to get the best results and to gradually establish a limited extent of the block. After a small dose has been given, time should be taken to evaluate the result. A successive dose can then be given if necessary to obtain the desired level. Avoiding haemodynamic changes is the cornerstone of the technique. Be careful with fluid administration and vasopressors (phenylephrine is more indicated here). Avoid valsalva manoeuvres and bearing down reflexes and use a low forceps technique. Oxytocics too have to be given via a continuous iv infusion if one want to avoid undesired haemodynamic effects.

Regional anaesthesia certainly is controversial in such cases, but we should give at least a chance to demonstrate its value. Anaesthetic management depends on attention to detail, and especially here to haemodynamic changes, as perhaps not the particular choice of the technique (general or regional) is so important. But regional anaesthesia has more advantages than general anaesthesia, as long as single (large bolus) injections are avoided. The key to success is cardio – obstetrician – anaesthesia team plan, the early institution of a regional block, preventing tachycardia and other unwanted haemodynamic effects and careful monitoring of the patient.

ADVICES

**Mitral Valve Stenosis**

Avoid tachycardia – Do not use epinephrine in the local anaesthetic solution

If possible, use spinal or epidural catheter, early in labour

Avoid an increase in preload – be careful with fluid load and phenylephrine

Avoid a decrease in afterload – and drugs that decrease myocardial contractility

**Treat all dysrhythmias**

Mitral Valve and Aortic Valve Regurgitation

Avoid bradycardia – mild tachycardia is acceptable

Local anaesthetics with epinephrine can be used (if no mitral stenosis is present)

Goal is to obtain afterload reduction

Avoid all drugs that decrease myocardial contractility

**Pulmonary valve and aortic valve stenosis**

Mild cases: regional anaesthesia is acceptable

Moderate cases: be very careful
Take time to institute the desired level of the block

**Contraindications for regional anaesthesia**

Patients with anticoagulation

Severe cases of pulmonary and aortic valve stenosis

**References**


