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Pregnancy after heart valve replacement -
Case report

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Summary
There is an increased risk of thromboembolism, antico-agulant-related haemorrhage, foetal-wastage, and conges-tive cardiac failure in pregnant women with mechanical heart valves. Pregnancy in such patients is a high risk venture. In order to have a good outcome, the care of such patients must necessarily be multidisciplinary and in a well-equipped centre with adequate support services. One such patient who had mechanical mitral valve replacement in 1986 and was on warfarin anticoagulant presented in April 2003 with a first trimester pregnancy. She was in sta-ble haemodynamic state and went through pregnancy with-out event. Delivery was by an elective caesarian section at 38 weeks gestation. The care of this patient during preg-nancy, delivery, and puerperium is the basis of this report.

Keywords: *Heart valve replacement, anticoagulant, preg-nancy*

Résumé
Il y a une augmentation de risque de thromboembolisme, l'hémorrhagie liée aux anticoagulants. La perte fétale et l'arret cardiaque chez les femmes enceintes ayant les val-ves méchaniques au coeur. La grossesse chez telles pa-tients represente un grand risque et les soins doivent nécessite l'appui de plusieurs disciplines et un centre bien -equipé avec des services adéquate de support.Un tel patient qui a eu un remplacement méchanique de la valve mitale en 1986 et etait sous recommendation de l'anticoagu-lant warfarin en Avrril 2003 a 3 mois de grossesse. Elle était dans un etat hémodynamique stable et progréssait en gros-sesse sans probléme, L'accouchement était par caeésarienne électrique a 38 semaines de gestation. Les soins du patient en grossesse et après l'accouchement ont été rapportés.

Introduction
All patients who have received a prosthetic heart valve are at risk of developing valve related complications, including thromboembolism and anticoagulant related haemorrhage. Consequently careful follow-up is mandatory. Pregnancy poses an additional problem for the woman with a mechanical heart valve because during pregnancy, there is an increased risk of hypercoagulability

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congestive cardiac failure, and the added risk of foetal wastage with use of warfarin [1,2].

Due mainly to childhood rheumatic heart disease, the young age at which a greater number of our patients with valvular heart disease receive prosthetic cardiac valves creates a pool of potentially marriageable females with mechanical heart valves on anticoagulation [3]. Additionally, the different socio-economic groups of these patients and the absence of health insurance will bear on the outcome of such pregnancies.

It is expected that heart centres in Nigeria and other West African countries will be confronted in the near future with an increasing number of pregnant women with prosthetic heart valves on anticoagulant therapy. Such centres must be equipped to manage such women adequately during pregnancy, delivery and the puerperium. We present one such case managed in our centre recently.

Case report
Mrs. N.L. presented in 1986 at 16 years of age on account of mixed mitral valve disease due to childhood rheumatic fever. At that time she was in class III of secondary education and had New York Heart Association Category IV disease. After stabilization with digoxin and frusemide she had mitral valve replacement with size 27mm Starr – Edward mechanical heart valve on 16 December 1986 at the National Cardiothoracic Centre, University of Nigeria Teaching Hospital, Enugu.

She recovered and no longer needed digoxin and frusemide but continued on oral warfarin anticoagulant. She completed her secondary education and proceeded to the polytechnic from where she graduated as an accountant. She got married in February 2003 and presented to us on 14 April 2003 on account of 7 weeks amenorrhoea. Her last menstrual period was on 6th February 2003 and her expected date of confinement was on 13th November 2003 based on a 28-day regular menstrual cycle prior to conception. At the time of presentation, she was still on warfarin. Pregnancy was confirmed by both urinary pregnancy test and pelvic ultrasonography. Assessment of her cardiac status at presentation showed her to belong to NYHA category I.

She was admitted and her anticoagulant changed to subcutaneous heparin 5000 i.u. 8hourly in addition to low-dose aspirin 75mg daily. While on admission her coagulation profile was monitored daily. The above doses of subcutaneous heparin and low-dose aspirin were found optimal. At 16 weeks gestation, an anomaly ultrasound

examination was carried out. The fetal morphology was sonographically normal. She was discharged home on 2nd May 2003 at 18 weeks gestation so as to continue her subcutaneous heparin and low-dose aspirin at home. She was reviewed weekly by our team. She remained clinically stable. Serial cardiac scans showed the mechanical valve to be in place and to be functioning optimally. Fetal growth was satisfactory based on serial clinical and ultrasonic evaluations.

On 27th October 2003 at 37 weeks gestation, she was re-admitted for an elective caesarean section. After admission, the heparin was converted to 12 hourly subcutaneous dosing regimens of 7500 IU in the morning and 10,000 IU at night.

On 3rd November 2003 at 38 weeks gestation, an elective lower segment caesarean section was carried out. The morning dose of heparin was skipped. General anaesthesia using the relaxant technique was used. While on pre-oxygenation, the patient received 0.6 mg of atropine intravenously for premedication. Anaesthesia was induced with low dose fentanyl 10 μg/kg augmented with propofol 1mg/kg. Endotracheal intubation was accomplished following a bolus dose of succinylcholine 1mg/kg. Anaesthesia was maintained with intermittent bolus doses of fentanyl and propofol 100ug and 20mg respectively. Muscle relaxation was achieved with 6 mg pancuronium bromide. Ventilation was manually controlled using 100% oxygen. The pulse, blood pressure, SPO_2 and the electrocardiogram were monitored.

The peritoneal cavity was entered through a subumbilical midline incision. Electrocautery was used to achieve haemostasis while doing this. Through a transverse lower segment uterine incision, a live normal male neonate weighing 3.4 kg with Apgar scores of 7 and 8 at 1 and 5 minutes respectively was delivered. A bolus dose of intravenous oxytocin 10 iu was given as soon as the baby was delivered. The placenta and membranes were delivered by controlled cord traction.

The uterine incision was meticulously closed in 2 layers to minimize haemorrhage. A tube drain was inserted in the uterovesical pouch to drain collection from uterine ooze. The abdominal wound was closed in anatomical layers. In order to reduce oozing from the skin edges, a continuous suturing was applied to the skin using No 1 Nylon suture. There was no intra-operative blood transfusion as loss was estimated at approximately 300 mls.

At the end of surgery, the relaxation was reversed with 2.5 mg of neostigmine and 0.6 mg of atropine. Spontaneous respiration was re-established shortly and patient left to breathe 100% oxygen. Sudden onset of chest and abdominal wall rigidity was observed a few minutes into the spontaneous respiration, which resulted in a significant drop in tidal volume and in arterial oxygen saturation. Respiratory assistance was recommenced while 10 mg bolus diazepam was given. The rigidity ceased after 20 minutes and patient extubated uneventfully. She was then taken to the Intensive Care Unit for postoperative care.

Shortly after delivery, the baby was given intramuscular Vit K_1. The heparin was recommenced approximately 6 hours post-partum. The bowel sounds were re-established the following day. Oral sips were started. Warfarin was also commenced alongside subcutaneous heparin. The patient's haemoglobin concentration on the 3rd postoperative day was 8 g/dl compared to the preoperative one of 11 g/dl. She was commenced on oral fesolate 200mg tds, folic acid 5mg tds and multivite 1 tablet tds. Breast feeding was also commenced on 3rd post-operative day by which time the mother was fit enough to do so. By the 4th postoperative day, the abdominal wound drain had drained a total of 1000mls. It was then removed. Serial monitoring of coagulation profile continued.

The subcutaneous heparin was discontinued when adequate anticoagulation as measured by prothrombin time ratio of 1.5 was achieved with warfarin. On the 14th post-operative day, the continuous skin suture was removed and the mother and her baby then discharged. They have remained well.

Disussion

The prevalence of pregnancy occurring in patients with cardiac valve prostheses in the West African sub-region is quite small. Frimpong-Boateng [3] has reported only three of such cases in Ghana. It is expected that with increasing number of children, teenagers, and young adults, with rheumatic valvular disease, receiving prosthetic valves, a large pool of marriageable women on anticoagulant is being formed. The demography of the Nigerian patients is similar to that of Frimpong-Boateng [3]. There is a high premium on pregnancy and childbirth and open heart surgery has not debarred women from getting married. This is in contrast to the report from Kenya [4]. The risk of pregnancy in the presence of mechanical cardiac prostheses and anticoagulants may be divided into maternal, foetal, and perinatal risks [5-10].

The patient presented was offered surgery at age 16. This highlights the young age at which rheumatic fever afflicts our citizens leaving in its trail valvular heart disease. She maintained her oral warfarin anticoagulant up to 7 weeks of gestation at which time we were notified of the pregnancy. Because of the risks of embryopathy, she was converted to heparin at presentation. At the end of first trimester we had two options for her anticoagulation - converting back to warfarin or continuing with heparin. Because of the continuing risk of foetal loss including intracranial haemorrhage, and since our patient was in sinus rhythm we chose subcutaneous heparin administration 8

hourly. The dosage was increased during the third trimester because of enhanced heparin neutralization due to platelet factor IV [11]. Delivery was by an elective caesarean section and involved the omission of the morning dose of heparin and its recommencement in the evening. Although vaginal delivery is not contraindicated, elective caesarean section allows delivery under controlled conditions. Besides, if women in our locality are given the impression that they can deliver normally, some may choose to deliver at home or in the church under the care of traditional birth attendants at great risk to both mother and baby. Thirdly, since the process of labour may be complicated by conditions that may warrant emergency caesarean section, this option is very risky for a cardiac patient in our environment because of institutional delays in handling obstetric emergencies as reported previously [12].

In carrying out elective caesarean section in such patients, meticulous attention must be paid to anaesthetic techniques and to haemostasis. With respect to anaesthesia, the use of fentanyl followed by propofol in our patient has the advantage of avoiding hypotension seen with propofol alone for induction, yet provided very good haemodynamic stability during surgery as reported by previous authors [13,14]. The muscle rigidity, which the patient developed just before extubation, is not uncommon with opiods in general. With fentanyl, it could be delayed 2-6 hours postoperatively in 7.6% of patients [15]. It is attenuated with benzodiazepines (as used in this patient) and barbiturates.

After the layered closure of the uterine incision, adequate haemostasis was thought to have been achieved. However, the subsequent loss of about 1 litre of blood due to oozing from the uterine wound strongly supports the insertion of a drain into the uterovesical pouch as was used in this patient. As soon as the risk of primary post partum haemorrhage is considered to be minimal, then anticoagulation, initially with heparin, should be re-started. Oral anticoagulant should be commenced along with heparin when the mother is able to take orally. The heparin is discontinued when adequate anticoagulation, as measured by prothrombin time ratio of greater than 1.5, has been achieved. The baby should be given intramuscular vitamin K at birth, and commenced on breast feeding when the mother is fit to do so and if she desires to breastfeed as warfarin administration is not a contraindication to breast feeding [2,16,17].

Conclusion and recommendations
A successfully managed case of pregnancy and delivery in a patient with a mechanical valve has been presented. Because of the risks involved in such patients, a team approach involving all the relevant specialties in a well-equipped centre is important for a favourable outcome.

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