



Physiotherapy in the planning stage, during pregnancy and the post-natal period in cystic fibrosis

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Advances in care have resulted in the desire and ability for women with cystic fibrosis to become mothers. In the 1980s it was thought to be too risky for a woman with CF to become pregnant. Nowadays, CF care teams can give better advice about the risks of pregnancy and how to minimize them. Knowledge and understanding of the unique effects and implications of pregnancy are essential for all health care professionals advising women with CF about pregnancy. Many CF centers provide genetic and pre-pregnancy counseling. The therapist providing physiotherapy advice (respiratory / physical therapist) working in close harmony with other members of the CF health care team plays a unique role in assisting women with CF to plan for and then cope with the normal physical changes of pregnancy, labor and the post-natal period, and in particular providing advice and practical instruction on physiotherapy and exercise during the childbearing year.

Planning for a pregnancy

It is widely recognized that a planned pregnancy is likely to result in fewer problems than an unplanned one. Each woman contemplating pregnancy should discuss the potential effects of pregnancy on all aspects of well-being and in particular lung function. The multi-disciplinary team involved in the regular care of women with CF during pregnancy consists of respiratory physician, obstetrician, physiotherapist (respiratory / physical therapist), nutritionist, and psychosocial support person. Referrals to other medical specialists and allied health practitioners may be required when women experience particular problems requiring the expertise of an additional health care specialist.

All women with CF who are considering pregnancy should review use of prescribed, over the counter, and complementary medicine with their respiratory physician, obstetrician and pharmacist prior to conception to avoid potential harmful effects on the fetus after conception. Appropriate inhaled, oral and intra-venous antibiotics for use during chest flare ups need to be discussed and planned. Some women may require an intra-venous antibiotic “tune up” prior to conception to ensure optimal health going into the pregnancy. This is an opportunity to review and optimize airway clearance therapy and exercise for use during pregnancy. Nutritional status together with vitamin and diet supplementation should be reviewed with the CF nutritionist. Cigarette smoking has been associated with reduced birth weight in infants and should be addressed before pregnancy if relevant.

Women who regularly participate in strenuous exercise and contact sports should discuss appropriate modifications to exercise during pregnancy that take into account the unique physiological changes of the childbearing year. All women are advised to approach pregnancy with a regular airway clearance therapy routine. This is especially the case for those who have relied solely on vigorous physical exercise as airway clearance therapy. Domestic support during pregnancy and afterwards together with childcare support once the baby has been born are necessary so that the mother has enough time and energy to carry out regular airway clearance, inhalation therapy and exercise.

Physiological changes during pregnancy

The pregnant hormones of *relaxin*, *progesterone*, *estrogen* and *cortisol* result in softening of the ligaments and increased joint laxity in preparation for the birth. It takes approximately three to six months for the body to return to the pre-pregnant state after the birth. Back pain is common during pregnancy. The normal spinal curves become exaggerated to counter-balance the enlarging abdomen. Breathlessness occurs in later pregnancy when the enlarged uterus pushes upwards against the lungs and inhibits the movement of the diaphragm. This may contribute to difficulty in removing lung secretions and increased breathlessness during exercise. Lower rib pain related to upward pressure of the growing fetus and urinary incontinence related to the downward pressure of



the enlarging uterus, swelling of the lower limbs and generalized fluid retention and calf cramps are common in pregnancy.

Airway clearance therapy during pregnancy in CF

Head-down tilted postural drainage is not recommended during pregnancy because of the common problem of gastroesophageal reflux in adults with CF. This regurgitation of stomach contents back up into the esophagus is further compounded by the hormonal effects of progesterone during pregnancy resulting in reduced muscle tone in the lower esophageal sphincter (the muscular 'valve' between the esophagus and the stomach). The growing weight of the developing fetus pressing against the stomach further increases the likelihood of gastric reflux. Techniques that aggravate nausea such as percussion and vibration should be avoided.

Airway clearance techniques suitable during pregnancy include:

- The Active Cycle of Breathing Technique
- Autogenic Drainage
- Positive Expiratory Pressure (PEP) therapy
- Oscillating Positive Expiratory Pressure (OscPEP) therapy
- Effective huffing from different lung volumes avoiding airway collapse with excessive force
- Physical exercise (appropriate to pregnancy) as airway clearance therapy
- Mucolytic (mucus thinning) agents that can be used during pregnancy as adjuncts to airway clearance therapy include inhaled hypertonic saline and Pulmozyme (Dornase alfa). Inhalation of Pulmozyme is usually continued if used prior to pregnancy.

Positioning during airway clearance therapy during pregnancy

Because of the physiological changes of pregnancy and the growing fetus, upright sitting with elbows supported on a table and the feet flat on the floor and a straight back is usually the most comfortable position for airway clearance therapy. This upright supported sitting position is also best for prevention or minimization of urinary incontinence and gastric reflux during treatment. Some women find left and right side lying in the horizontal position or slightly head up to be more effective during airway clearance therapy. Lying flat on the back should be avoided during the 2nd and 3rd trimesters to avoid the negative effects of pressure on the large blood vessels bringing blood back to the heart from the lower body of the mother and the fetal circulation via the placenta. There is also an increased likelihood of gastric reflux in this position.

Pelvic Floor Function

Women with CF should be taught pelvic floor muscle strengthening exercises early in pregnancy to prevent or treat urinary incontinence. These exercises should be emphasized throughout pregnancy and the post-natal period when urinary incontinence is a common problem. Increase in fluid intake and activity levels such as walking together with regular toilet habit help ease constipation, another common problem in pregnancy.

Exercise during pregnancy

Pregnant women are advised to modify their physical exercise program during pregnancy. Contact sports should be avoided. Walking and swimming are appropriate forms of exercise. Strategies for avoiding over-heating, dehydration and electrolyte and salt depletion should be discussed with the CF team. Advice on posture and the most comfortable standing, sitting and lying down positions together with strengthening, mobilizing and stability exercises assist in managing the normal pregnancy changes which often result in pain in the back and neck and sometimes other joints.

Pain in the joints at the front and back of the pelvis occurs commonly around 29 – 32 weeks. An elastic binder worn low below the belly to give support to these pelvic joints while standing and walking can provide significant relief. Stretching and separation of the abdominal muscles as a result of the growing fetus require care with exercise. A therapist with expertise in the area of exercise during pregnancy and the post-natal period should teach correct ante-natal exercises (including in particular, abdominal and pelvic floor exercises) early in the pregnancy and should encourage their use throughout pregnancy and the post-natal period.

Physiotherapy interventions during pregnancy

Lower limb edema (swelling) should be prevented by avoiding prolonged standing. Rest with feet elevated and pumping the feet up and down exercises and elastic support stockings are beneficial. Physiotherapy advice about comfortable supported sleeping positions using extra pillows, relaxation and stress management techniques are useful strategies. Muscle cramps are common especially in late pregnancy. They may be caused by altered blood flow and pressure of the uterus on the nerves or dietary issues. Calf stretches during the day, support stockings, medical advice on nutritional



requirements such as calcium or salt and massage may relieve the problem. Stretching the feet downwards on waking up should be avoided as calf cramps commonly follow this activity. Instead pulling the feet upwards when stretching will help prevent cramps.

Physiotherapy during labor in CF

Pain, shortness of breath on exertion and low oxygen saturation are common for all women during labor. Oxygen saturation has been measured at 98% the day after delivery, whereas in labor it went as low as 87% in women without CF. Thus desaturation may be marked in some women with CF during labor. Oxygen therapy should be provided to maintain normal saturation when required. Broncho-dilator therapy to open up the airways and assistance with sputum clearance may be required for some women during labor. Conservation of energy strategies should be used. Adequate pain relief during labor is a high priority for women with CF, with normal vaginal delivery highly desirable in order to minimize post-delivery complications.

Physiotherapy post-Caesarian section in CF

Adequate post-operative pain relief, oxygen therapy (if required), appropriate inhalation therapy in the form of broncho-dilator and / or mucolytic (sputum thinning) agents together with optimal airway clearance therapy are priorities post-Caesarian section. Getting up, sitting out of bed and walking around should occur as soon as medical staff give the go-ahead for these activities in order to prevent post-operative lung complications. Controlling pain with medication, optimal positioning and abdominal support during coughing should allow for effective sputum removal. An experienced therapist should provide assistance with airway clearance therapy and supported coughing soon after delivery by Caesarian section.

Physiotherapy in the post-natal period in CF

The body goes through another phase of hormonal and physical change in the period after delivery. The effects of the hormone *relaxin* are maintained for up to twelve weeks after birth. These have implications for the joints and muscles most affected by the changes of pregnancy. The intensity of exercise needs to be restricted during this period and post-natal exercises prescribed by a therapist trained in this area are recommended either individually or in a group setting. The cardiovascular system returns to normal within two weeks, with blood volume returning to pre-pregnant levels. The respiratory system returns to normal soon after delivery.

Physical support for the mother is a priority after birth. She needs to have time and energy to carry out appropriate airway clearance therapy, inhalation therapy and physical exercise and also have the opportunity for daytime rest to counteract the interrupted nights' sleep and tiredness that result from feeding and looking after her baby.

Summary

Frequent contact with the CF team and the obstetric team should be encouraged during pregnancy and the post-natal period. The CF team therapist has an important role to play during the child-bearing year related to airway clearance physiotherapy, appropriate exercise therapy and managing the common problems that occur during pregnancy and the post-natal period. Where there is a lack of skills or experience, referral to an appropriate therapist with specialist physiotherapy expertise should occur. Pregnant women should be encouraged to attend education sessions provided by a women's health physiotherapist for education relating to the changes and demands of pregnancy, labor and the post-natal period.

References

1. Button BM, Roberts S, Kotsimbos T, Wilson J. Symptomatic and silent gastroesophageal reflux (GOR) in adults with cystic fibrosis. *Journal of Cystic Fibrosis* 2003; Volume 2(1): 254A.
2. Miller JH, Ashton-Miller JA, DeLancey JOL. A pelvic muscle pre-contraction can reduce cough-related urine loss in selected women with mild stress urinary incontinence. *J Am Geriatr Soc* 1998; 46: 870-874.
3. Bo K, Kvarstein B, Hagen RR, Larsen S. Pelvic floor muscle exercise for the treatment of female stress urinary incontinence. *Neurourol and Urodyn* 1990; 9: 470-478.



4. Button BM, Sherburn M, Chase J, Stillman B, Wilson J. Pelvic Floor Muscle Function in Women with Chronic Lung Disease (Cystic Fibrosis and COPD) versus controls: Relationship to Urinary Incontinence. *Pediatric Pulmonology* 2005; Suppl 28, A368.
5. Button BM, Sherburn M, Chase J, Stillman B, Wilson J. Effect of a Three Months Physiotherapeutic Intervention on Incontinence in Women with Chronic Cough Related to Cystic Fibrosis and COPD. *Pediatric Pulmonology* 2005; Suppl 28, A369.
6. Johannesson M, Carlson M, Bergsten Brucefors A, Hjelte L. Cystic fibrosis through a female perspective: psychosocial issues and information concerning puberty and motherhood. *Patient education and Counselling*. Elsevier 1998; 34:115-123.
7. Johannesson M. Effects of pregnancy on health: certain aspects of importance for women with cystic fibrosis. *J of Cystic Fibrosis*. 2002;(1):9-12.
8. Button B, Holland A. Physiotherapy for Cystic Fibrosis in Australia: a Consensus Statement. <http://www.thoracic.org.au/physiotherapyforcf.pdf>. Accessed 16 April,2008.