

Reference Bibliography

July, 1950; Alvarez, Caldeyro; [Contractility of the Human Uterus Recorded by New Methods](#)

- First method consists in recording the pressure exerted on the amniotic sac (pressure of amniotic fluid) and the record is made during pregnancy and during the first and second stages of labor. The second method consists in the recording of placental pressure (blood pressure in placental and cord vessels after the birth of child and the clamping of the cord), and the record is made during the third stage of labor.

December, 1950; Caldeyro, Alvarez, Reynolds; [A Better Understanding of Uterine Contractility through Simultaneous Recording with an Internal and a Seven Channel External Method](#)

- The contractility of the human uterus during labor is recorded simultaneously by internal and external methods. The integration of results obtained by each allows a much more complete understanding of uterine contractility than when either method is used alone.

Unknown, 1957; Caldeyro-Barcia, Pose, Alvarez; [Uterine Contractility in Polyhydramnios and the Effects of Withdrawl of the Excess of Amniotic Fluid](#)

- 25 cases of polyhydramnios the contractility of the uterus has been studied by recording the amniotic fluid pressure. During labor in cases of polyhydramnios, the uterine fibers are able to contract as strongly as in normal cases. Yet, due to the overdistention of the uterus, the contractions are reduced in their intensity and labor progresses slowly. This is the main cause of prolonged labor in this condition. Correction of the overdistention by withdrawl of the excess fluid will make uterine contractility normal and will accelerate the progress of labor.

March 1957; Caldeyro-Barcia, Sica-Blanco, etc.; [A Quantitative Study of the Action of Synthetic Oxytocin on the Pregnant Human Crisis](#)

- The infusion of oxytocin produces an increase of the intensity and of the frequency of the contractions. An exponential relation is found between the oxytocin infusion rate (inf) and the increase (ΔUA) of uterine activity produced by the infusion. $\Delta UA = (\Delta_{max} UA)(1 - e^{-Rinf})$

Unknown, 1960; Cibils, Pose, Fielitz, etc.; [Effect of Position changes on the Intensity and Frequency of Uterine Contractions during Labor](#)

- It is found that when the patient lies on her side (left or right), uterine contractions have a stronger intensity and lower frequency than when the patient lies on her back (law of position). The effects of the change of position on uterine contractility appear immediately and last for as long as the new position is maintained. The law of position is fulfilled by more than 90% of spontaneous labors and 76 % of those induced with oxytocin infusion.

October, 1964; Csapo; [Extraovular Pressure-its Diagnostic Valve](#)

- An extraovular rather than intra-amniotic method has been developed for the recording of the amniotic pressure of pregnant and parturient patients. The technique is simple, safe, and accurate. The patients do not object to it, not even to its diagnostic and prognostic potential, the method is recommended for routine use, aiding the management of spontaneous and induced labor.

January, 1972; Lima, Montenegro; [Tocometry in Obstetric Practice: The Development of a Pneumatic System](#)

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1972; Neuman, Jordan, Roux, Knoke; [Validity of Intrauterine Pressure Measurements with Transcervical Intra-Amniotic Catheters and an Intra-Amniotic Miniature Transducer during Labor](#)

- The accuracy of transvaginal intrauterine pressure measurements was determined in 21 subjects in labor, 12 of which were monitored with two transcervical intrauterine catheters and one miniature intrauterine pressure transducer, and 9 subjects of which were monitored with a double lumen transcervical catheter. It is concluded that no single uterine pressure observation is an accurate reflection of uterine pressure during labor.

April, 1974; Serr; [Methods for Recording the Continuous Fetal Heart Rate and Uterine Contractions](#)

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March, 1975; Sauvage, Villanueva; [Intrauterine Pressure Monitoring with a Balloon-Tipped Catheter](#)

- The extraovular balloon method has two minor shortcomings: The sensor must be introduced before the fetal presenting part is engaged, and it must be free of air when in use.

August, 1974; Arroyo, Mendez-Bauer; [The maintenance of a stable baseline in intra-uterine pressure with varying maternal position-A practical approach](#)

- When measuring intra-uterine pressure, the tracing baseline varies according to maternal position because of changes in hydrostatic pressure. To compensate for this effect, the membrane of the transducer should always be kept close to the uterine fundus. An additional advantage of this method is that it enables the use of a short catheter thus causing less tracing artifacts.

June, 1975; Steer, Little, Lewis, etc.; [Uterine Activity in Induced Labor](#)

- 12 Patients with, and 8 without membrane rupture were closely matched for factors likely to influence the character and duration of labor. In both groups uterine activity increased until a stable state was achieved following which there was little alteration until delivery.

August, 1978; Steer, Carter, Gordon, Beard; [The Use of Catheter-Tip Pressure Transducers for the Measurement of Intrauterine Pressure in Labor](#)

- The disadvantages of the fluid filled polythene catheter used for measuring intrauterine pressure have been overcome by designing a catheter with a pressure transducer at the tip. The information which it gives is accurate and reliable.

Unknown, 1979; Ulmsten, Andersson, Lindstrom, Persson; [Determination of Myometrial Tension During Labor by Combined Microtransducer IUP-Recording and Ultrasonic Examination of the Uterine Cavity](#)

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November, 1980; Huch; [Panel Discussion: Cesarean Section](#)

- Different doctors discuss the pros and cons of a cesarean section. Many other questions are answered about different possibilities monitoring with continuous tissue pH, terminating the pregnancy.

March, 1984; Steer, Carter, Beard; [Normal Levels of Active Contraction Area in Spontaneous Labour](#)

- UAI is the measure which shows the closest correlation with rates of cervical dilatation in the active phase of labour. This is probably because it reflects all the contraction variables rather than just one. Contraction frequency does not have a significant correlation with the rate of cervical dilatation.

March, 1986; Hutson, Petrie; [Possible Limitations of Fetal Monitoring](#)

- Electronic FHR monitoring is a major advance in assessing the fetal condition during labor and in providing more knowledge of the fetal mechanisms that allow the fetus to adapt to a changing intrauterine environment. This advance has helped change obstetrics from an art to a science.

March, 1987; Phillips, Calder; [Units for the Evaluation of Uterine Contractility](#)

- An improved system of units is proposed for evaluating the contractile activity of the myometrium. Mean active pressure (in kPa) provides the best overall measure of contractility. This measure is broadly compatible with studies quoting “uterine activity integral” in kPa s per 15 min, but may be applied to any period of time. Units suggested for measuring the amplitude, frequency, and duration of contractions. It is shown that these are independent variables, and that mean active pressure is the numerical product of these three components.

January, 1986; Svenningsen, Jensen; [Application of Fiberoptics to the Clinical Measurement of Intra-Uterine Pressure in Labor](#)

- This method utilizes a fiber-optic pressure transducer which is both accurate and stable. The sensor is located at the catheter tip thus eliminating hydrostatic errors during monitoring. A comparison was made between recordings from the fiber-optic pressure transducer and those from a fluid-filled catheter implanted simultaneously in non-selected subjects during labor. The measuring point is not identical in each system. No problems with insertion of the device and without any indication of equipment malfunction.

July, 1988; Carter, Steer; [Technology and Fetal Monitoring](#)

- Technology is now available to produce EFM that are comfortable for the woman being monitored, are easy for the user to operate, present data in a safe, reliable and accurate manner, are small, and have low capital and running costs. Improvements in signal processing, data interpretation and the production of new ways to refine the diagnosis of “fetal distress” should further enhance the benefits obtained by electronic monitoring of the fetus during pregnancy and parturition.

August, 1988; Strong, Paul; [Intrapartum Uterine Activity: Evaluation of an Intrauterine Pressure Transducer](#)

- A newly available intrauterine pressure transducer was evaluated clinically in 100 patients. Successful insertion was accomplished in 95%. There were no significant intrapartum or maternal fetal complications. The intrauterine transducer required no maintenance and appeared to be practical in laboring women.

March, 1990; Shy, Luthy, Bennett, etc.; [Effects of Electronic Fetal-Rate Monitoring , As Compared with Periodic Auscultation, on the Neurologic Development of Premature Infants](#)

- Assessed the early neurologic development of 93 children born prematurely whose heart rates were monitored electronically during delivery and compared it with that of 96 children born prematurely whose heart rates were periodically monitored by auscultation. All the children were singletons with cephalic presentation, and all weighed ≤ 1750 g at birth.

November, 1991; Arulkumaran, Mrcog, etc.; [Reliability of Intrauterine Pressure Measurements](#)

- The reliability of intrauterine pressure measurements was studied by placing two catheters in the same uterus in women in labor. 19 parturients were studied. Among the 1429 contractions studied, the catheters showed differences of pressure of less than 5 mmHg in 86% of contractions and of less than 10 mmHg in 94%. The difference in the total active pressures shown by the two catheters was less than 5% in 17 cases and 5% or more in two cases. These differences are of no importance.

April, 1993; Margono, Minkoff, Chan; [Intrauterine Pressure Wave Characteristics of the Upper and Lower Uterine Segments in Parturients with Active-Phase Arrest](#)

- 16 patients delivered vaginally. Nine received oxytocin augmentation, and all had significantly higher pressure in the upper segment than in the lower both before and after oxytocin ($P < .001$). Six women delivered by cesarean had a reversed gradient of uterine activity, with the lower segment contracting significantly more strongly than the upper uterine segment both before ($P = .002$) and after oxytocin ($P = .001$).

August, 1993; Devoe, Smith, Stoker; [Intrauterine Pressure Catheter Performance in an In Vitro Uterine Model: A Simulation of Problems for Intrapartum Monitoring](#)

- In most extreme experimental conditions, the catheter types behaved similarly when detecting “intrauterine” pressure. The sole exception, thick meconium simulation, suggests that fluid-filled catheters would be less reliable in this condition unless flushed continuously with saline.

Unknown, 1994; Ross, Walton; [Artificially Elevated Basal Uterine Tonus Resulting from Measurement of Hydrostatic Pressure by Transducer-Tipped Intrauterine Catheters](#)

- Eight laboring patients received intrauterine placement of a transducer-tipped IUPC. Catheters were zeroed to air pressure, electronic zero was checked, and monitors were calibrated before insertion. Catheters were not rezeroed during labor. Basal resting uterine pressures were recorded at insertion and before IUPC removal.

Unknown, Unknown; Arrabal, Nagey; [Is manual palpation of uterine contractions accurate?](#)

- Manual palpation of uterine contractions is an inaccurate means of determining contraction strength.

August, 1978; Trudinger, Pryse-Davies; [Fetal Hazards of the Intrauterine Pressure Catheter: Five Case Reports](#)

- Five patients with fetal complications associated with the use of an intrauterine pressure catheter in labor are described. In four, a fetal vessel was punctured either by the catheter or its introducing sheath. In the remaining patient, cord compression resulted from entanglement with the catheter. These problems may be minimized by a careful catheter introduction technique.

October, 1979; Spaulding, Gallup; [Current Concepts of Management of Rupture of the Gravid Uterus](#)

- Fifteen cases are reported of spontaneous rupture of the gravid uterus occurring at the Naval Regional Medical Center (NRMHC), Portsmouth, Virginia, over a 21-year period. 47% of the patients had previously undergone a cesarean section. 13% of the patients had received oxytocin prior to the rupture. Fetal mortality associated with these ruptures was 13%. No maternal deaths occurred. 47% of the patients had repair of the defect, with 60% undergoing some type of hysterectomy. Preventive measures, early diagnosis, and prompt treatment are emphasized.

Unknown; Nel; [An unusual case of uterine rupture](#)

- An unusual case of uterine rupture in a primigravida, in which the left leg of the infant ruptured through the posterior fundal of the uterus, is presented. No definitive predisposing cause could be found. Some of the clinical signs and symptoms resembled those of abruptio placentae. Recording of internal uterine pressure revealed increased basal tone and frequent small contractions, as are often seen with abruptio placentae. This could possibly have been due to prostaglandin release from the injured decidua.

April, 1981; [Major Complications Associated with Intrauterine Pressure Monitoring](#)

- The intrauterine pressure catheter should be used for certain indications, such as for

monitoring the effect of oxytocic agents, evaluating abnormal lobar patterns, and helping define the relationship between contractions and fetal heart rate decelerations. Any bleeding or nonremitting baseline change in the fetal heart rate following the insertion of the intrauterine pressure catheter should be attended to promptly and the patient prepared for an immediate delivery in the presence of fetal distress.

January, 1983; Wittich; [Rupture of an Unscarred Uterus During Labor: Case Report](#)

- High parity was present and oxytocin was used, cephalopelvic disproportion was not a factor nor did abruptio placenta occur. The common clinical features of vaginal bleeding, lower abdominal pain and shock were present, but diagnosis was not made until after delivery of the baby, as it is in 40 percent of the cases. The rupture was complete, with extension into the left broad ligament, and the recommended therapy of hysterectomy was performed. While the maternal and perinatal mortality rates are statistically high, the resuscitation of shock preceding surgery in our patient was successful and, fortunately, both the patient and the baby did well.

Unknown; Wiswedel; [Rupture of the uterus in a primigravida](#)

- After induction with oxytocin because of premature rupture of the membranes, a cesarean section had to be performed on a primigravid patient owing to fetal distress. At laparotomy a fundal rupture of the uterus was found. Rupture of the primigravid uterus in the absence of obstetric trauma or congenital abnormality is rare, and apparently only 4 cases have been reported.

Unknown; Geme, Murray, Carter, etc.; [Perinatal bacterial infection after prolonged rupture of amniotic membranes: An analysis of risk and management](#)

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November, 1987; Stovall, Shaver, Solomon, Anderson; [Trial of Labor in Previous Cesarean Section Patients, Excluding Classical Cesarean Sections](#)

- Trial of labor is a safe alternative for those patients with a single lower uterine segment vertical scar or transverse scar, as well as for patients with multiple uterine scars. Patients who have a recurring indication for their primary cesarean section should not be restricted from undergoing trial of labor. Oxytocin augmentation or induction is a safe and effective means of increasing the vaginal delivery rate, and may be used for the usual obstetric indications. Oxytocin should be used cautiously, and should not be begun until internal uterine pressure monitoring is established. Epidural analgesia can be safely offered to patients with a previous cesarean section who are undergoing a trial of labor.

Unknown; Dibble, Elliot; [Possible Amniotic Fluid Embolism Associated With Amnioinfusion](#)

- Polyhydramnios and subsequent fetal distress are the only documented complications of amnioinfusion described in the literature. Two possible cases of amniotic fluid embolism associated with amnioinfusion. Symptoms developed at the time the fluid bolus for amnioinfusion. Both patients recovered completely with extended supportive care.

Unknown; Scisione, Manley, etc.; [Placental Abruptio Following Placement of Disposable Intrauterine Pressure Transducer System](#)

- Four cases of placental abruptio following insertion of a disposable intrauterine pressure transducer system (INTRAN). All four patients had placental abruptions, which were evident soon after insertion of all disposable intrauterine pressure transducer system. Careful patient selection and gentle insertion of the system opposite the placental site.

Unknown; Strong, Hetzler, Paul; [Amniotic fluid volume increase after amnioinfusion of a fixed volume](#)

- Amnioinfusion of 250 ml of normal saline solution was performed in 30 laboring women at ≥ 37 weeks gestation with oligohydramnios as defined by an amniotic fluid index of ≤ 5 cm. A total of 50 amnioinfusions were performed. Amniotic fluid volumes, as assessed by the amniotic fluid index, increased by a mean of 4.3 ± 1.5 cm after infusion.

July, 1989; Haubrich; [Amnioinfusion: A Technique for the Relief of Variable Deceleration](#)

- Amnioinfusion provides a new and exciting method for the management of variable deceleration in the laboring patient. In the future, the procedure also may be applied to other clinical situations in which a decreased volume of amniotic fluid compromises the status of the fetus. Nurses who participate in amnioinfusion have the important task of observing, assessing, and teaching the patient.

February, 1990; Owen, Henson, Hauth; [A Prospective Randomized Study of Saline Solution Amnioinfusion](#)

- 100 patients were randomized, 43 to undergo amnioinfusion and 57 to be in a control group. Patients undergoing amnioinfusion had a significantly decreased incidence of postpartum endometritis and a lower incidence of cesarean delivery that was due to fetal distress in labor. The use of amnioinfusion also made a significant contribution to the four-quadrant ultrasonographic estimate of amniotic fluid volume. All other maternal and neonatal outcome parameters were similar between the two groups. The saline solution amnioinfusion in labor may be a beneficial procedure but that further studies are needed.

February, 1978; Thadepalli, Appleman, etc.; [Amniotic Fluid Contamination during Internal Fetal Monitoring](#)

- Amniotic fluid samples collected through the intrauterine catheter were found to be contaminated with bacteria in 15 of 30 consecutively monitored patients during labor. Aerobes were the exclusive isolates in eight, anaerobes in five and both in two patients. Eleven patients developed puerperal fever. One patient developed gonococcal amnionitis, and her newborn infant later developed gonococcal septicemia. The overall risk of infection associated with internal monitoring in our study was 50% for amniotic fluid contamination and 37 % for puerperal febrile morbidity.

July, 1985; Miyazaki, Nevarez; [Saline Amnioinfusion for Relief of Repetitive Variable Decelerations: A Prospective Randomized Study](#)

- This prospective randomized study clearly showed that saline amnioinfusion is a logical, safe, simple, and effective therapy for the relief of repetitive variable decelerations in the first stage of labor. Amnioinfusion significantly decreased the incidence of cesarean section for fetal distress in the nulliparous patient and was more effective than the traditional treatment of changes in position.

July, 1985; Nageotte, Freeman, etc.; [Prophylactic Intrapartum Amnioinfusion in Patients with Preterm Premature Rupture of Membranes](#)

- Demonstrates the benefit of prophylactic amnioinfusion in patients with preterm premature rupture of the membranes in the reduction of incidence and severity of variable decelerations and in improvement of the metabolic state at delivery as reflected by higher umbilical blood pH. The ease of administration, patient acceptance, and lack of complications make this treatment a viable clinical modality for these high-risk pregnancies. Caution needs to be exercised in attempting to extrapolate these results to term postdates with oligohydramnios.

September, 1988; Galvan, etc.; [Using Amnioinfusion for the Relief of Repetitive Variable Decelerations during Labor](#)

- The goal of amnioinfusion therapy is to replace lost or absent amniotic fluid in situations of umbilical cord compression severe enough to lead to fetal compression. It is effective intervention in the alleviation of variable decelerations during labor when the conventional treatments of position change and oxygen administration have not been effective. This is safe and simple.

April, 1989; Newton, Prihoda, Gibbs; [Logistic Regression Analysis of Risk Factors for Intra-Amniotic Infection](#)

- 70% of patients who developed intra-amniotic infection met the risk criteria several hours before diagnosis was evident clinically. For most antibiotics, maternal therapeutic levels are achieved within minutes and placental transfer occurs rapidly. Therapeutic cord blood levels are obtained within 15-30 minutes of injection.

April, 1986; Sperry; [Amniotic Fluid Embolism: To Understand an Enigma](#)

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April, 1986; Steiner, Lushbaugh; [Maternal Pulmonary Embolism by Amniotic Fluid](#)

- A new obstetric disease was recognized which has its distinctive symptomatology, etiology and pathology. The series is composed of cases which previously had been called obstetric shock, idiopathic postpartum uterine atony with hemorrhage, acute pulmonary edema of pregnancy and other obscure diseases, for all of which a causation had not previously been known.

Unknown; Lameier, Katz; [Amnioinfusion: A Review](#)

- Randomized studies comparing amnioinfusion to no therapy have shown that amnioinfusion is associated with lower cesarean delivery rates, decreased numbers of operative deliveries, and improved umbilical artery and venous blood gas values. Amnioinfusion also has been suggested as a means to instill antibiotics into an infected uterine cavity, or the uterine cavity of a woman with preterm premature rupture of the membranes. Overall, amnioinfusion seems to be a safe and effective technique to improve the intrauterine milieu.

May, 1994; Maher, Wenstrom, Hauth, Meis; [Amniotic Fluid Embolism After Saline Amnioinfusion: Two Cases and Review of the Literature](#)

- Amniotic fluid embolism is a rare cause of maternal morbidity and mortality. It is not known whether amnioinfusion increases the rate of its occurrence in laboring patients. No change in clinical practice is warranted on the basis of these reports; however, future reports must be examined so that any common factors can be identified.

September, 1990; Posner, Ballagh, Paul; [The effect of amnioinfusion on uterine pressure and activity: A preliminary report](#)

- Studied in a systematic fashion the relationships between uterine tone and activity during intrapartum amnioinfusion. We measured uterine tone and quantitated uterine activity in 10 patients undergoing amnioinfusion and compared values 20 minutes before, during, and 20 minutes after amnioinfusion. A case of uterine hypertonus and fetal bradycardia and a suggested procedure scheme for intrapartum amnioinfusion are presented.

August, 1997; Spang; [Amnioinfusion: Indications and Controversies](#)

- Amnioinfusion, an easy procedure to perform, can increase the amniotic fluid volume and relieve variable decelerations. Amnioinfusion is relatively useful and beneficial.

April, 1927; Bourne; [The Dosage and Action of Pituitary Extract and of the Ergot Alkaloids on the Uterus in Labor with a note on the Action of Adrenalin](#)

- All pituitary extract sold in Great Britain will by law bear on the label of each ampoule the number of units present in one cc. It is probable that many extracts will be prepared so as to contain 10 units per cc. We have investigated the action of small doses administered during the first and second stage of labor, recording the effect by means of a graphic method.

March, 1957; Poseiro, Alvarez, etc.; [A Quantitative Study of the Action of Synthetic Oxytocin on the Pregnant Human Uterus](#)

- The effect of uterine contractility of synthetic oxytocin given by continuous infusion at the rates of 1, 2, 4, 8, 16, and 32 mU/min. has been quantitatively studied on pregnant women. The record of the amniotic fluid pressure gives an isometric tracing of uterine contractions. Uterine activity is measured by the product of the intensity multiplied by the frequency of the contractions.

November, 1985; Steer, Carter, Beard; [The effect of oxytocin infusion on uterine activity levels in slow labor](#)

- 31 women studied who were progressing slowly in spontaneous labor. In 75%, levels of uterine activity were below the tenth centile for normal spontaneous labor. Following oxytocin infusion, there was a significant increase in uterine activity to a mean of 1124 kPas/15 min, which was the same as in normal spontaneous labor. The response to oxytocin was dependent upon the pre-existing level of uterine activity, and sensitivity to oxytocin.

October, 1988; Schreyer, Sherman, Ariely, Herman, Caspi; [Ripening the Highly Unfavorable Cervix With Extra-Amniotic Saline Instillation or Vaginal Prostaglandin E2 Application](#)

- In all cases but one, an increase of the Bishop score of three or more points occurred during a 6-hour period. Prostaglandin E2 tablets (3 mg) applied in the posterior vaginal fornix (once or twice) resulted in an increase in the Bishop score of three or more points in 39 of 54 cases during the 12-hour study period. No severe side effects were registered in either procedure.

May, 1989; Davidson, Butler, etc.; [A Beltless Tocodynamometer- A Preliminary Report](#)

- The beltless tocodynamometric system is convenient and simple to use, and assesses uterine activity more efficiently than the belted system. It eliminates the primary cause of instability in the belted system, ie, the belt, and is perceived by patients and staff as a clear improvement over the conventional tocodynamometer.

September, 1978; Huey, Paul, Jilek, etc.; [Fetal Heart Rate Variability: An Approach to Automated Assessment](#)

- 375 hours of fetal heart rate data derived from the direct fetal electrocardiogram were studied. This data had been stored on magnetic tape from 83 intrapartum patients. By means of a computerized technique, the FHR variability was assessed quantitatively. The degree of variability was then related to: (1) state of labor, (2) fetal scalp pH values, and (3) the 1-minute Apgar score.

May, 1980; Carter, Gunn, Beard; [Fetal Heart Rate Monitoring Using the Abdominal Fetal Electrocardiogram](#)

- Monitoring using the ECG during parturition was found to be unreliable. The advantages of the method are that it is non-invasive, the patient is not restricted by belts and the technique is easy to apply. However the uncertainty of obtaining a FHR trace between 24 and 36 weeks gestation is a major disadvantage.

October, 1981; Weller, Dyson, etc.; [Fetal Electroencephalography Using A New, Flexible Electrode](#)

- A single flexible active electrode for monitoring the fetal electroencephalogram (FEEG), has been designed specifically for use in routine obstetrics. It does not require penetration of or adherence to the fetal scalp, and it is reusable. The equipment's performance has been tested in 20 normal labors. The recordings obtained were not contaminated by the fetal electrocardiogram and were relatively free from artefact so that minimal filtering of the signal was required.

June, 1982; Ferrara, Widrow; [Fetal Electrocardiogram Enhancement by Time-Sequenced Adaptive Filtering](#)

- The principle advantage of adaptive signal enhancing techniques is that the power spectra of the signal and noise need not be shown a priori. However, the time-sequenced method requires that good estimates be available for the pulse locations in time in order to synchronize the filter regeneration cycle with the fetal cardiac cycle. Better methods of locating the fetal pulse positions may be necessary in order to use time-sequenced approach with recordings having SNR's lower than that presented here.

January, 1985; Divon, Torres, etc.; [Autocorrelation Techniques in Fetal Monitoring](#)

- Autocorrelation enhances signal-to-noise levels of periodic phenomena and helps in detecting fetal heart rate from a noisy background. In the absence of fetal heart signals, it may produce a factitious "heart rate" by detecting any periodic motion originating from mother and/or the fetus. It is therefore important to realize that whenever there is doubt as to the origin of the signals that are displayed as a fetal heart rate or whenever clinical action is to be taken based on the externally derived fetal heart rate, the validity of these observations should be verified.

July, 1985; Kariniemi, Rosti; [Abdominal Electrocardiography in Intrapartum Fetal Heart Rate Monitoring](#)

- Abdominal fetal electrocardiography as a means of intrapartum fetal heart rate monitoring was studied in 700 consecutive labors in a small hospital. 68 pregnancies were excluded from the study because of the elective cesarean section or because labor was too short for electronic monitoring. AFECG succeeded throughout labor in 99 of 632 monitored labors. Ultrasound was needed first with the use of AFECG, and later with the use of direct FECG.

Unknown, 1986; Oosterom; [Spatial Filtering of the Fetal Electrocardiogram](#)

- One of the basic problems in the analysis of the rhythm and the shape of the fetal ECG is the interference caused by the electrical activity of the maternal heart. Methods devised for suppressing the maternal signals in the abdominally recorded leads obviously have to rely on differences in the characteristics of both kinds of signals. In the past various differences have been employed for this purpose such as differences in wave shape, frequency content and source location.

Unknown, 1986; Cerutti, Baseli, etc.; [Variability Analysis of Fetal Heart Rate Signals as Obtained from Abdominal Electrocardiographic Recordings](#)

- The autospectrum of fetal HRV indicates that here the basic 10s rhythm exists as well thus indicating the effect of ANS in mediating sympathetic and parasympathetic drives. Another rhythmic component in the depolarizing of the fetal sino-atrial node is also evident which is synchronous with maternal respiration frequency, thus confirming a complex interaction between a mechanical influence of maternal breathing and a neural reflex in the fetus.

Unknown, 1986; Carter; [Advances in Electronic Fetal Monitors - Real or Imaginary](#)

- Changes in the technologies used in the latest generation of electronic fetal monitors has resulted in

an improvement in the quality of the FHR data produced. However, in a number of instruments the use of inappropriate printers and signal processing has led to a degradation in the FHR trace. This may result in difficulties in interpretation of the data thereby putting the compromised fetus at risk.

March, 1986; Boehm, Feids, etc.; [The indirectly obtained fetal heart rate: Comparison of first and second-generation electronic fetal monitors](#)

- Supports the use of the Hewlett-Packard 8040A fetal monitor to indirectly obtain a more accurate FHR tracing. The interpretation of FHR variability from an external tracing appears to be more reliable when this second-generation fetal monitor is used than when the first-generation monitors are used.

Unknown, 1986; Holsher; [A Novel Approach for an ECG Electrode Integrated into a Transcutaneous Sensor](#)

- The integration of an ECG-electrode into a common transcutaneous sensor allows simple handling and leads to a reduction of the physiological stress of pre-term infants. Furthermore it may allow future replacement of an invasive method to measure the ECG under labor by a non-invasive one.

October, 1987; Frank, Gibbs, etc.; [Adaptive Filtering in ECG Monitoring of the Fetal Heart Rate](#)

- 25 sets of noninvasive fetal ECG data were collected from pregnant subjects during the third trimester of pregnancy using maternal abdominal paste-on electrodes. The fetal QRS amplitude and shape varied from 5 to 30 microvolts with fetal position, gestational age, and relative electrode configuration.

September, 1987; Randall, Steer, Sutherland; [Detection of the Fetal ECG during Labor by an Intrauterine Probe](#)

- A preliminary investigation into the feasibility of detecting the FECG from within the uterus without piercing the fetal skin has been carried out. The presence of amniotic fluid attenuates the available signals even when intimate electrode to skin contact can be made. Consideration of an electrical model shows that good skin contact and a degree of electrode isolation are required for optimum detection of the high signals levels potentially available. A probe has been designed that allows easy insertion and encourages the conditions for good signal detection. It has been found that both fetal and maternal ECGs can be detected with a success rate of around 90% although signal strengths vary greatly.

August, 1978; Trudinger; [Fetal Hazards of the Intrauterine Pressure Catheter: Five Case Reports](#)

- Five patients with fetal complications associated with the use of an intrauterine pressure catheter in labor are described. In four, a fetal vessel was punctured either by the catheter or its introducing sheath. In the remaining patient, cord compression resulted from entanglement with the catheter. These problems may be minimized by a careful catheter introduction technique.

August, 1978; Nuttal; [Perforation of a placental fetal vessel by an intrauterine pressure catheter](#)

- Perforation of a fetal vessel on the placental surface by an intrauterine catheter is reported. The immediate recognition of this unusual complication is important. To minimize the risks of perforation, haemorrhage and infection, several precautions should be observed when inserting the catheter.

March, 1981; Madanes; [Major Complications Associated with Intrauterine Pressure Monitoring](#)

- A case of uterine perforation by an intrauterine pressure catheter is described. Five similar cases from the literature are reviewed. A revision of the pressure catheter insertion technique is discussed.

April, 1984; Geme, Murray, Carter, et. al; [Perinatal bacterial infection after prolonged rupture of amniotic membranes: An analysis of risk management.](#)

- A model was used for evaluation and prediction of perinatal bacterial infection. Analysis of 46 infants prior to and 310 infants after implementation of this process indicated significant improvement in the appropriated management of these infants at risk. Inappropriate antibiotic therapy decreased.

January, 1987; Tabor, Maier; [Polyhydramnios and Elevated Intrauterine Pressure During Amnioinfusion](#)

- Amnioinfusion has been demonstrated to be useful in relieving and preventing repetitive variable decelerations. There have been no reported complications. This case illustrated the potential for iatrogenic polyhydramnios and elevated intrauterine pressure during amnioinfusion.

1993; Lameier, Katz; [Amnioinfusion: A Review.](#)

- Amnioinfusion is a commonly practiced technique used for intrapartum improvement of the fetal condition. Room temperature normal saline infused through an intrauterine pressure catheter has been used to alleviate variable decelerations, dilute thick meconium, and improve the intrauterine environment.

December, 1995; Handwerker, Selick; [Placental Abruption After Insertion of Catheter Tip Intrauterine Pressure Transducers: A Report of Four Cases](#)

- Four cases are described of abruption occurring immediately after insertion of catheter tip intrauterine pressure transducers in patients without risk factors for abruption. Although the risk of injury is small, neonatal morbidity can be severe, and an evaluation of risk versus benefit should be made prior to insertion of these devices.

20th Edition, 1997; Williams Obstetrics; [Complications Associated with Amnioinfusion](#)

- Uterine hypertonus, Abnormal fetal heart rate tracing, Amnionitis, Cord prolapse, Uterine rupture, Maternal cardiac or respiratory compromise, Placental Abruption, Maternal Death

Hofmeyr, Gulmezoglu, Buchmann, et. al; [Amnioinfusion for Meconium Stained Liquor with Standard Peripartum Surveillance](#)

- Evaluates amnioinfusion for meconium stained liquor.

July, 1985; Miyazaki, Nevarez; [Saline amnioinfusion for relief of repetitive variable decelerations: A prospective randomized study.](#)

- A prospective randomized study was undertaken in order to further investigate the effect of intrauterine saline amnioinfusion for the relief of repetitive decelerations in the first stage of labor. Intrauterine saline amnioinfusion corrects the oligohydramnios that makes the cord more vulnerable to compression during uterine contractions.

May, 1994; Maher, Wenstrom, Hauth, Meis; [Amniotic Fluid Embolism After Saline Amnioinfusion: Two Cases and Review of the Literature.](#)

- Two cases of fatal amniotic fluid embolism occurred in women who were treated during labor with a saline amnioinfusion. In both cases, amnioinfusion was administered after finding thick meconium staining of the amniotic fluid.

September, 1990; Posner, Ballagh, Paul; [The effect of amnioinfusion on uterine pressure and activity: A preliminary report.](#)

- Transcervical intrapartum amnioinfusion of normal saline solution is being used in a number of centers. Over the past few years indications for the procedure have included prophylaxis and treatment of intrapartum decelerations in both term and preterm gestations dilution and lavage of meconium-stained amniotic fluid, and for direct administration of antibiotics within the amniotic cavity in cases of chorioamnionitis.

October, 1995; Wenstrom, Andrews, Maher; [Amnioinfusion Survey: Prevalence, Protocols, and Complications](#)

- Amnioinfusion is performed nationwide according to widely varying protocols with few associated complications. Neither the method employed nor the number of infusions performed appears to significantly increase the risk of having a complication.

1996; Repke, Livingston, Strong; [Amniotic Fluid Dynamics and Modulations.](#)

- Amnioinfusion has not been associated with increased rates of amniotic fluid embolism, placental abruption, uterine rupture, umbilical cord prolapse, amnionitis, or maternal cardiopulmonary compromise.

1985; Miyazake, Nevarez; [Saline Amnioinfusion for relief of repetitive variable decelerations: a prospective randomized study.](#)

- A prospective randomized study was undertaken in order to further investigate the effect of intrauterine saline amnioinfusion for the relief of repetitive variable decelerations in the first stage of labor. This study clearly showed that saline amnioinfusion is a logical, simple, safe, and effective therapy for the relief of repetitive variable decelerations in the first stage of labor and can lower the incidence of cesarean sections for fetal distress in nulliparous patients. Furthermore, amnioinfusion was much superior to changes in position in treating repetitive variable decelerations.

1990; Strong, Hetzler, Sarno, Paul; [Prophylactic intrapartum amnioinfusion: a randomized clinical trial.](#)

- Amnioinfusion was performed in a prospective, randomized trial of 60 women in the latent phase of labor with oligohydramnios, as defined by an amniotic fluid index ≤ 5.0 cm. All fetuses were at least 37 weeks' gestation age, had normal baseline fetal heart rate variability, and no clinically significant fetal heart rate decelerations at the outset. We conclude that prophylactic intrapartum amnioinfusion is an important technique for the reduction of intrapartum morbidity.

1994; Spong, Ogundipe, Ross; [Prophylactic amnioinfusion for meconium-stained amniotic fluid, abstracted.](#)

- Study to show that prophylactic amnioinfusion for meconium stained amniotic fluid improves perinatal outcome. Though amnioinfusion does dilute amniotic meconium, prophylactic amnioinfusion for meconium, in the absence of variable decelerations, remains controversial. Together with recent reports, these data indicate a significant portion of meconium aspiration may occur prior to labor. Prophylactic amnioinfusion in term pregnancies did not improve perinatal outcome and increased the risk for chorioamnionitis.

1987; Miyazake: [Concern about saline amnioinfusion.](#)

- Letter of concern regarding prolapsed umbilical cord reported 2 hours after saline amnioinfusion procedure. Reply: Since termination of the study in March, 1984, saline amnioinfusion has become a routine procedure. There have been no additional instances of cord prolapse in over 400

amnioinfusions (1:400). The usually quoted incidence of cord prolapse in vertex presentation is 1:200. The conclusions are obvious: no causal relationship.

1994; Wenstrom, Andrews, Maher; [Prevalence protocols and complications associated with amnioinfusion, abstracted.](#)

- Study to determine if amnioinfusion is associated with labor and delivery complications, and in complication type and incidence is related to the infusion method. Results, amnioinfusion is performed nationwide according to widely varying protocols with few associated complications. Neither the method employed nor the number of infusions performed appears to increase risk of having a complication.

1992; Strong, Vega, O'Shagnessey, et al; [Amnioinfusion among women attempting vaginal birth after cesarean delivery.](#)

- Eighteen of 901 women (2%) attempting vaginal birth after cesarean delivery receive amnioinfusion. No untoward effects occurred in the subjects or their fetuses. We conclude that, though amnioinfusion in the setting of a vaginal birth after cesarean delivery attempt is needed only infrequently, it appears to be a reasonable intrapartum management option. The usual safeguards for a vaginal birth after cesarean attempt should be followed.

1989; Rodriguez, Masaki, Phelan, et al; [Uterine rupture: are intrauterine pressure catheters useful in the diagnosis?](#)

- The usefulness of the intrauterine pressure catheter in the diagnosis of uterine rupture was assessed by review of 76 cases of uterine rupture, 39 of which were monitored with an intrauterine pressure catheter. The classic description of a loss of intrauterine pressure or cessation of labor was not observed in any of the patients. However, an increase in baseline intrauterine pressure was associated with severe variable decelerations such that by itself the intrauterine pressure catheter added little to the diagnosis of uterine rupture.

1993; Sciscione, Manley, et. al; [Placental Abruption Following Placement of Disposable Intrauterine Pressure Transducer System](#)

- There have been few reported complications of intrauterine pressure monitoring. We present four cases of placental abruption following insertion of a disposable intrauterine pressure transducer system (INTRAN). All four patients had placental abruptions, which were evident soon after insertion of the disposable intrauterine pressure transducer system (all of our cases had predisposing factors or signs of placental abruption at presentation). Whether there was a preexisting placental abruption, which was caused, revealed, or worsened by insertion of the disposable intrauterine pressure transducer system is unclear. We encourage careful patient selection with gentle insertion of the system opposite the placental site.

1994; Nel; [An unusual case of uterine rupture](#)

- An unusual case of uterine rupture in a primigravida, in which the left leg of the infant ruptured through the posterior fundal part of the uterus, is presented. No definitive predisposing cause could be found. Some of the clinical signs and symptoms resembled those of abruptio placentae. Recording of internal uterine pressure revealed increased basal tone and frequent small contractions, as are often seen with abruptio placentae. This could possibly have been due to prostaglandin release from the injured decidua.

1992; Dibble, Elliott; [Possible amniotic fluid embolism associated with amnioinfusion.](#)

- Polyhydramnios and subsequent fetal distress are the only documented complications of amnioinfusion described in the literature. We report two possible cases of amniotic fluid embolism associated with amnioinfusion. Symptoms developed at the time of fluid bolus for amnioinfusion. Both patients recovered completely with extended supportive care.