THE AUTOMOBILE AND PREGNANCY

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THE ever-increasing number of automobiles in both cities and smaller communities and the increased congestion on all highways have brought new problems to the obstetrician.

The motor car has undoubtedly contributed to lower maternal and fetal mortality by making good hospitals and well-trained personnel accessible to many more mothers. However, accidents involving pregnant women do occur, are often of more serious nature because of the pregnancy and may result in maternal and fetal mortality.

During 1950, there were about 35,000 people who lost their lives by traffic accidents in this country. No figures are available as to how many of these were pregnant women. Of the many girls who were injured but recovered, many will present obstetrical problems in the future.

TRAVEL IN PREGNANCY

Since World War II a few articles, including that of Diddle,[1] have been published tending to show that travel has little or no effect on the incidence of abortion. This is a very difficult question to answer statistically. Danforth,[2] writing in Curtis' Obstetrics and Gynecology, on prenatal care, states "Long automobile trips should not be taken. A good practical rule at this time, when nearly every family has a car, is that the prospective mother may take any journey in an automobile, provided the roads are good, which may be accomplished in an hour. It is true that the risk of miscarriage after automobile journey is not great but every physician with a large obstetrical experience has seen occasional cases in which a long journey has been followed by abortion." With this we agree and enumerate a few instances we have had during the past few years where travel was associated with abortion or premature labor.

CASE I.—Mrs. H., age, 21, gravida II, para I.—Term delivery 1947. Took auto trip from Indianapolis to Covington, Kentucky, for Christmas 1947 when 3 months pregnant — spontaneous abortion.

CASE II.—Mrs. L., age 32, gravida II, para I.—Term delivery 1947. Auto trip from Indianapolis to Jacksonville, Florida, when 4 months pregnant. Bleeding started shortly after arrival — spontaneous abortion.

CASE III.—Mrs. C., age 26, gravida II, para I.—Delivered first baby at term

endometriosis in young women, and those women in the child-bearing age who want more children.

In 1949, we reported 13 cases of endometriosis and pregnancy. Twelve patients were operated upon because of endometriosis and later had normal pregnancies. In some of these patients one ovary was removed at the time of operation, and in others endometrial cysts were removed from both ovaries, but some normal ovarian tissue was left. In most of the patients adhesions around the fallopian tubes were freed, and in a few weeks after operation conception occurred.

In one patient the endometriosis was not recognized until the patient was delivered by Cesarean section. Twelve patients operated upon because of endometriosis were later delivered of 14 normal term pregnancies. Several of these patients had been sterile for many years prior to the operation for endometriosis.

We have seen young women have two or three normal pregnancies then develop endometriosis, become sterile, and then after operation with the removal of some areas of endometriosis and freeing of adhesions, again conceive and deliver normal babies.

Endometriosis is a common cause of sterility in young women. I do not think that the use of contraceptives increases the chances of a patient developing endometriosis, but we do advise married women to have their children early.

Spontaneous arrest of endometriosis does seem to occur in some patients even when pregnancy does not occur.

In conclusion, let me advise conservatism and the preservation of the child-bearing function in young women who have endometriosis. Pregnancy frequently occurs in women in the child-bearing age after conservative operations for endometriosis.

Dr. Harold A. Gainey, Kansas City, Missouri (closing).—I would like to thank the discussants for their comments. Our observations of other statistically recorded phases of endometriosis are comparable to those in the literature regarding infertility and the incidence of conception following conservative surgery. It was thought, for the purpose of this paper, that it was best to report lesions unaltered by surgery or radiation. It was interesting to note that in clinically recognized cases of endometriosis, there were few with marked growth, these undoubtedly due to decidual hyperplasia and as mentioned, with spontaneous involution in the last trimester and subsequent regression as noted postpartum. This was particularly striking in the case of recto-vaginal endometriosis. Comments predicting the reaction, particularly regarding involution of endometriosis, have to be guarded as the clinical observation of the non-pregnant will reveal regression and reactivation of these lesions.

January, 1948. Auto trip to Nebraska for Christmas 1949, when 7 months pregnant. Was immediately taken to hospital. Baby weighed 2½ lbs. – lived.

CASE IV.—Mrs. T., age 41, gravida III, para II. Term deliveries: (1) 7-4-36 and (2) 10-22-40. When 3 months pregnant drove car to Springfield, Missouri (450 miles) – spontaneous abortion.

CASE V.—Mrs. B., age 24, para 0, gravida I.—Bleeding started after traffic accident and patient aborted the following day.

CASE VI.—Mrs. M., aged 28, para 0, gravida I.—When 5½ months pregnant patient took weekend auto trip. B.O.W. ruptured day after trip and patient aborted.

CASE VII.—Mrs. S., age 28, para 0, gravida I.—5 months pregnant. Train trip. Started from California to Indianapolis. Started bleeding and cramping en route. Removed from train in Kansas – aborted. Since has had full term baby.

CASE VIII.—Mrs. K., age 30, para I, gravida II.—Five months pregnant. Took auto trip to Holland, Michigan. Bleeding started following day. Stopped after several days of bed rest. Went to term and delivered normal baby.

In addition to the possibility of loss of the pregnancy, there is also the chance that this might occur at a place where competent medical care is not available. Who can tell when there is going to be severe hemorrhage associated with spontaneous abortion? Some of our most severe cases of abruptio placentae are not associated with toxemia or trauma, there being no known etiology. A patient traveling in the third trimester suddenly stricken with an abruption of this type, a ruptured cesarean section scar or hemorrhage from placenta praevia, might lose her life as a consequence of her trip.

RESULTS OF COLLISION DURING PREGNANCY

The Fetus: So well is the fetus protected that it is seldom injured directly in utero. Silbernagel[3] reported a case of intra-uterine fetal death after the mother had been thrown with the abdomen striking the pavement. Autopsy of the baby showed death to be due to a traumatic heart. A patient was admitted to Charity Hospital in New Orleans[4] after an automobile accident and the baby, delivered by cesarean section, was found to have a skull fracture.

The fetus in utero may perish because of abruption placentae or rupture of the uterus. If the mother maintains shock level blood pressure for any length of time, the fetus will die because of anoxia. (See Fig. I and Fig. II.)

The Mother: After auto collision, the pregnant woman may receive no injury or there may be serious injury. When the latter occurs, it may be injury of bone or of soft tissue. Often it is both. Bone injuries may be of major type and, of these, fractures of the pelvis are probably

of the most importance from the obstetrical standpoint. The bladder is frequently injured with pelvic fractures. If the patient has been thrown to the pavement with great force particularly directed to the abdomen, there may be injury to any of the abdominal organs or even the diaphragm. However, the large pregnant uterus will itself usually bear the brunt of the force, serving as a protector against injury to the gastrointestinal tract. If there is reason to suspect intra-abdominal injury, exploration must be done as soon as possible after shock therapy. A torn and bleeding spleen may require removal. Any perforation of the gastrointestinal tract or any hollow viscus must be repaired. If the uterus is uninjured, the pregnancy should be left undisturbed even if near term according to the experience of Eckerling and Teoff[5]. These men had the experience of working on injured pregnant women after the bombing of the civilian population in Jerusalem in 1948.

They also state "When the uterus has been injured, pregnancy has to be terminated by cesarean section irrespective of the viability of the fetus. The uterus is then treated conservatively or removed according to the extent of the injury."

MAJOR AUTO COLLISION WITH NO INJURY TO MOTHER OR BABY

(Case Report)

Mrs. K., para I, gravida II.—First baby delivered by cesarean section in 1948. May 2, 1950, this patient was on her way to the office for a routine prenatal check. She was driving alone in a new car and did not notice new stop light that had recently been placed. At a speed of about 35 miles per hour, her car struck a large truck at a cross street and was demolished, being a total loss. She was removed to the hospital by the police ambulance. X-Rays showed no fractures and she was examined by an orthopedic surgeon who could find no injuries except a few skin abrasions. The fetal heart did not vary so the patient was discharged after 48 hours. On May 29, 1950, the author did another cesarean section with a living 7-lb. boy.

TRAUMATIC ABRUPTIO PLACENTAE

The most likely soft tissue injuries to be found after auto collision are rupture of the uterus and abruptio placentae. To differentiate these two conditions in a patient that has been in an accident, is still in shock and with absence of fetal heart tones, is usually impossible. This must be remembered when treatment is inaugurated. Many of us believe that in the abruption placentae of severe type not associated with trauma, a trial of conservative treatment can be employed. However, because the traumatic type cannot be differentiated from rupture of the uterus, active operative treatment should be employed as soon as blood is available.

SEVERE ABRUPTIO PLACENTAE FOLLOWING AUTO COLLISION

(Case Report)

Mrs. S. L., age 33, was admitted to the Chicago Lying-in Hospital January 26, 1926, while I was on birth room duty. She was a multipara who was on the way to the hospital in labor when the cab in which she was riding was in collision with another. On admission, the patient was pale, cyanotic and was crying, "I am dying." She constantly held her hand on her abdomen on one area and was in constant pain. Pulse was 104 and B.P. 100/70. The abdomen was board-like and the baby could not be outlined. There was no fetal heart tones. Rectal examination showed the head high and the cervix 2 cm. dilated. There was a small amount of bloody discharge upon displacing the head. She was given morphine and transfused. Dr. Greenhill operated upon her under local supplemented by ethylene anesthesia. There was a moderate amount of bloody serum in the peritoneal cavity and the uterus was of the Couvelaire type. The placenta was entirely separated and there was no rupture. The stillborn baby and the placenta were delivered and a subtotal hysterectomy plus a left salpingo-oophorectomy done. The patient had a stormy convalescence complicated by phlebitis and pneumonia but recovered, was discharged May 3, 1926, and later sued the cab company.

In the bibliography of his chapter on Ruptured Uterus, Eastman lists a report by Woodhull[6] on "Traumatic Rupture of a Pregnant Uterus Resulting from Auto Accident." This patient was a multipara whose car was in a head-on collision with another. The patient was thrown out of the right door, landing on her back. She was removed to the hospital in shock. Fetal heart tones had disappeared and there was slight vaginal bleeding. X-Ray showed fractures of the 5th lumbar vertebra on the right and the 4th and 5th on the left. A diagnosis of abruptio placentae was made and the patient's condition improved after transfusion. One month later the patient was seen by the author of the report and a pelvic mass apart from the uterus palpated. Laparotomy on Sept. 7, 1940, revealed rupture of the uterus. Hysterectomy was done and the patient recovered.

Abruptio placentate may be present after an accident, all classic symptoms and signs absent and yet the separation continues, causing death of the fetus. This is the big reason for having fetal heart tones checked carefully and frequently for at least three days after a major accident.

Case Report.—Mrs. C. W., age 21, para I, gravida II.—8 months pregnant. Driving to Indianapolis with her husband. The latter attempted to miss a dog, his car skidded and was struck by a large truck on the patient's side. The patient did not lose consciousness. B.P. 135/90 taken immediately after accident by a local physician. No vaginal bleeding. Taken to St. Vincent's Hospital. F.H.T. strong in lower right quadrant – no tenseness of abdomen – position S. L. A. No abdominal pain. X-Ray showed fracture of 6th rib on left near border of scapula, fracture of cuboid, right ankle. B. P. 130/90.

On admission –		F. H. T.	
6-16-51	9:15 P.M.	160	Hb. 63
	11:30 P.M.	160	RBC 2,950,000
6-17-51	2:30 A.M.	160	WBC 19,000
	3:20 A.M.	160	
	4:30 A.M.	174	
	5:30 A.M.	156	
	1:00 P.M.	160	
	6:00 P.M.	168	
	9:35 P.M.	160	
6-18-51	12:30 A.M.	160	
	3:00 A.M.	160	
	9:00 A.M.	Not heard (called to see patient)	
6-19-51	4:00 A.M.	Labor started	
	5:30 A.M.	Slight mucous discharge	
	6:30 A.M.	Slight bloody show	
	10:50 A.M.	B.O.W. ruptured – considerable bleeding	
	10:55 A.M.	Delivery–Manual aid–Placenta followed baby	
		Given 1,000 cc. blood	

The only clue to the abruptio was the low red count.

FRACTURES DURING PREGNANCY

Fractures occurring in early or middle pregnancy usually present no immediate obstetrical problem except in case of accompanying uterine injury or abruption placentate. Dr. G. J. Garceau,[7] Professor of Orthopedic Surgery at Indiana University states that in his experience the incidence of non-union in major fractures during pregnancy is higher than in the non-pregnant.

In pelvic fractures near term, if the baby is alive after the accident and the patient not in shock, the question of whether to deliver from above or below becomes a problem, especially if labor starts.

We agree with Voegelin and McCall[8] that elective cesarean section should be done when there is obvious obstruction with a severe lateral crushing and where there is marked displacement in the region of the symphysis pubis where injury could occur to the urethra or bladder. A trial of labor can be employed in borderline cases. The orthopedic surgeon may prefer that we do cesarean section as a safeguard against further displacement of bone fragments relative to the patient being placed in exaggerated lithotomy position.

There may be injury to the uterus without extensive hemorrhage and if the baby is not in distress and the membranes intact, the injury not suspected. The following case will illustrate:

CASE: Patient of Dr. C. Jinks – Mrs. M. B., age 31, para V, gravida VI. – Near term was in an automobile collision on 10-15-40. She was driving the car and at the time of collision was thrown violently against the gear shift knob and the side of the car. She was taken to the Methodist Hospital where X-Ray showed

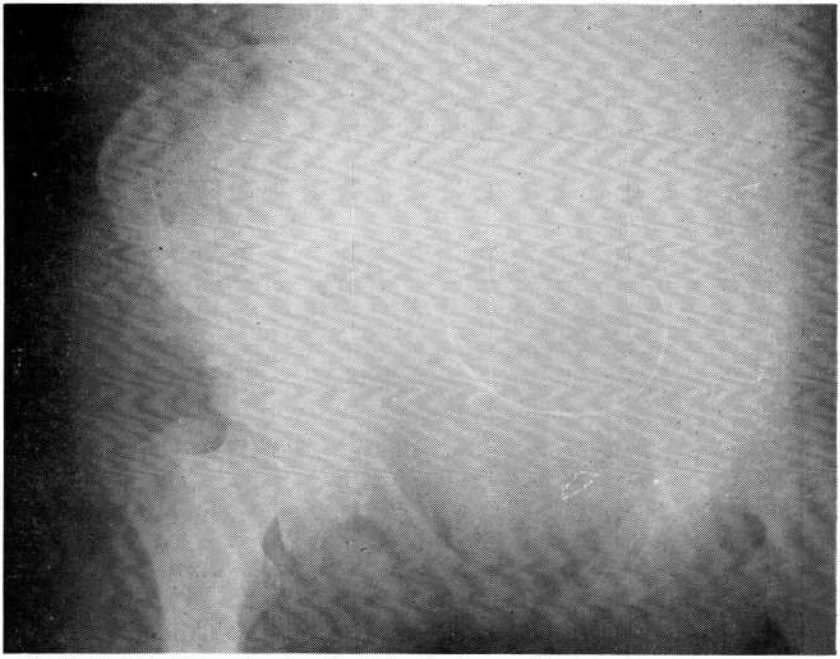


Fig. I. Bedside Plate showing Multiple Fractures of Pelvis after Auto Accident. Note fetus of 8 months. Patient in deep shock for several hours.

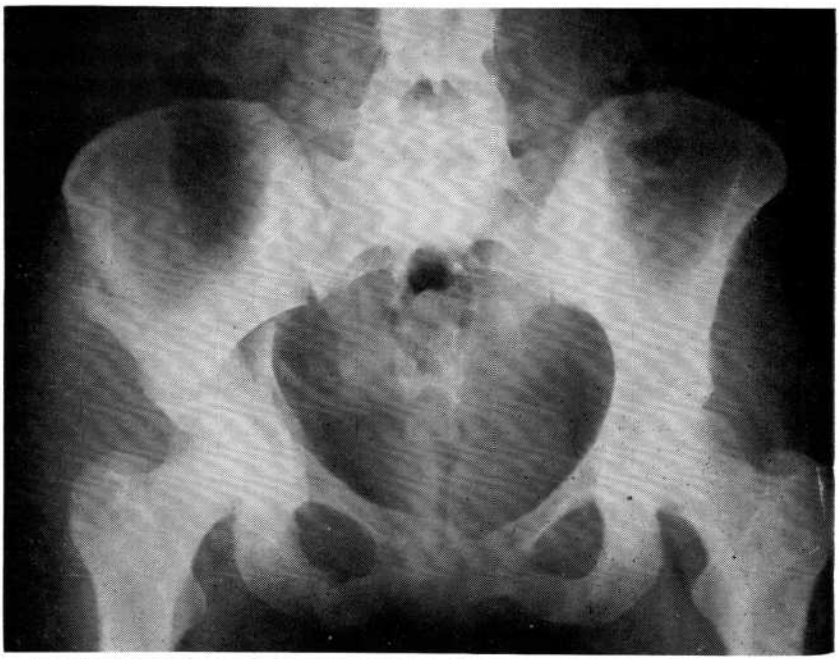


Fig. II. Later X-Ray of Patient in Fig. I. Dead Fetus was expelled one week after accident. No Abruptio. Mother recovered.

an oblique fracture at the junction of the superior ramus and body of the left pubis without displacement. There was an irregular vertical fracture through the horizontal ramus of the left ischium and an oblique fracture through the mid-portion of the horizontal ramus of the right ischium. In a few hours an elective cesarean section was done. Upon entering the peritoneal cavity, a hole in the uterus the size of the gear shift knob was found and through this the intact membranes could be seen. Only a small amount of hemorrhage had occurred. A uterine incision was made incorporating the hole and a live boy weighing 8 pounds, 9 ounces, was extracted. Both mother and baby recovered.

As previously stated, little is found in the literature concerning small injuries to the pregnant uterus. However, Zondek[9] reported a case observed during the Palestine disturbance in 1939. A primigravida, age 24, was brought to the hospital in severe shock shortly after having been wounded in the abdomen from the explosion of a bomb. Four wounds were seen in the right side of the abdominal wall just below the umbilicus. Fetal heart tones were not heard distinctly. After antishock therapy, laparotomy was done. Entering the abdomen, two wounds were seen in the uterine wall. Blood and amniotic fluid were dripping through the holes. The uterus was opened and a live baby extracted. Shrapnel had entered the placenta and much bleeding into the amniotic cavity had followed. The uterus was sutured after excision of the injured tissue. Post-operative convalescence was uneventful except for suppuration in the abdominal wall.

Last June, N. F., a 24-year-old gravida IV, was admitted to Indianapolis General Hospital in deep shock, having shot herself in the abdomen while in a parked car. After blood was started she was operated upon. The bullet had made a cesarean wound in the top of the uterus and the stillborn baby was extracted from the uterus without an additional incision in the uterus. The uterus was repaired. The bullet had plowed a pathway posterior to the peritoneum and there was a large subperitoneal hematoma. The patient died shortly after the operation and autopsy was not performed.

OLD PELVIC FRACTURES

Because of increased incidence of pelvic fractures and improved mortality, we are seeing more traumatic pelves, the result of previous pelvic fractures. The following table shows the number that were admitted to the obstetrical department of our largest general hospital during the past five years:

TABLE I

Year	No. of Deliveries	Cases with old Fracture of Pelvis
1946	4355	1
1947	4840	2
1948	4542	2
1949	5028	3
1950	5539	4
TOTAL	24304	12

The obstetrical management will depend largely on the degree of pelvic contraction caused by the injury and in borderline cases, tests of labor will help in cephalic presentation. Many cases will show little displacement and distortion and will deliver from below. X-Ray pelvimetry should be used as an aid.

Illustrative cases seen by us during the past few years follow:

OLD FRACTURES

CASE I.—Mrs. A. (1931)—Double Fracture of Pelvis.
1-20-37 — Low Forceps — Girl 6-1½
11-15-47 — Low Forceps — Boy 6-12½

CASE II.—Mrs. K., age 32, para 0 — Fracture of Pelvis 15 years ago.

X-RAY PELVIMETRY

Inlet	A. P.	10.5
	Trans.	13
Mid Pelvis	A. P.	13.5
	Trans.	8.5

11-4-47 — Trans. Cervical Cesarean after 12-hour labor — Girl 7-1.

CASE III.—Mrs. M. R. — 1st Delivery 11-3-36 — M. R. — Mid Forceps.
Auto Accident 1939 — Fracture of Pelvis
2nd Delivery 11-14-43 — Low Forceps — Boy 9-6
3rd Delivery 8-31-45 — Breech Ext. — Boy 11-5 (26-hour labor)

CASE IV.—Mrs. C. — Auto accident December, 1939 — Fractured Pelvis and Head Injury.

X-RAY PELVIMETRY

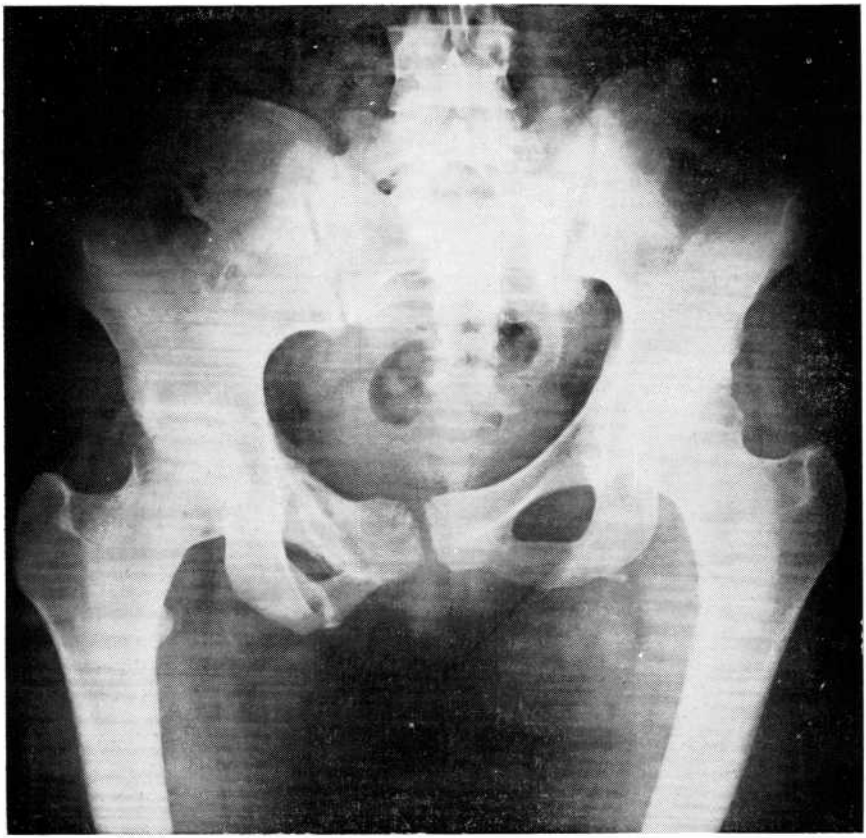
Inlet	A. P.	13.5
	Trans.	12
Mid Pelvis	A. P.	14.5
	Trans.	8

6-10-47 — Trans. Cervical Section after 3 hours of labor with B.O.W. ruptured. Marked overriding of head. Station –3. Girl 7-7½

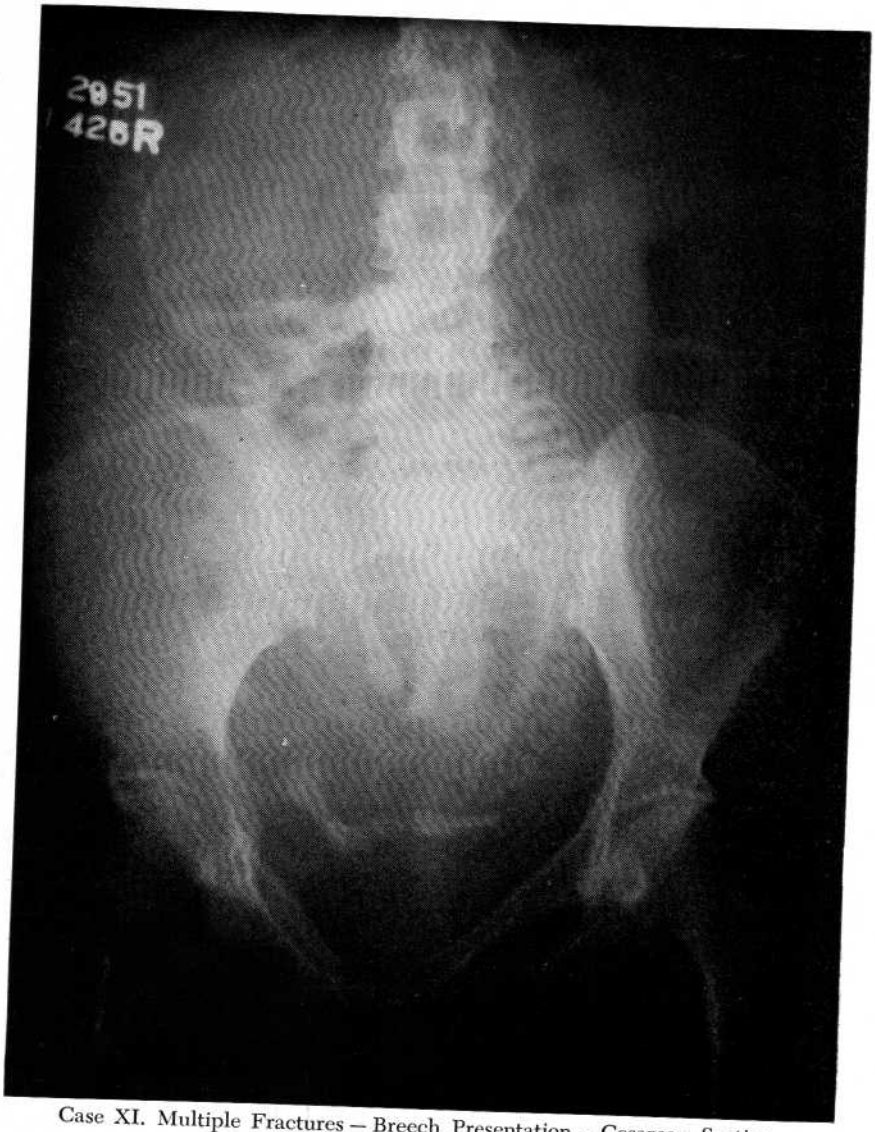
CASE V.—Mrs. B. – Pelvic Fracture at 16 – Now 37 years – (Horizontal ramus of pubis – right).

1942 – Spantaneous Delivery
1946 – Spontaneous Delivery
1950 – Spontaneous Delivery

CASE VI.—Mrs. N. – Normal Delivery 1944 – St. Louis – Boy 4-9.
1947 – Auto accident with Multiple Pelvic Fractures – 5 Months in Hospital.
7-23-49 – Cesarean Section at St. Louis – Boy 4-13½ (Refused Trial Labor).



Case X. Multiple Fractures of Pelvis with two following vaginal deliveries.



Case XI. Multiple Fractures – Breech Presentation – Cesarean Section.

Case VII.–Mrs. H. C. – age 32 – para 0 – Fracture of Pelvis 9 years ago. Told then she probably would need Cesarean Section.

X-Ray Pelvimetry

Inlet	A. P.	10.5
	Trans.	11.5
Mid Pelvis	A. P.	12
	Trans.	9

Low Forceps 8-5-47 – Boy 6-10

CASE VIII.—Mrs. G. — age 30 — Double Fracture of Pelvis at 17.

	1.	4- 7-40	Elsewhere
Cesarean Section	2.	3-16-47	Elsewhere
	3.	4-20-48	

CASE IX.—Mrs. K. — age 22 — para 0. Auto accident 1947. Fracture of Sacrum.
6-7-50 — Low Forceps — Girl 7-2

CASE X.—Mrs. V. H. — age 18 — para 0. (Dr. Salzman.) (See Fig.)

8-31-48 — Auto accident with Multiple Fractures of Pelvis involving right ischium, right sacrioliac, right sacral wing and complete fracture of superior and inferior rami of pubis on left.

6-3-49 — Spontaneous — 8 mo. — Girl 3-6½ — Survived

2nd Preg. — Low Forceps — Term — Girl 5-13¾

CASE XI.—Mrs. I. — age 30 — para 0 — Pelvic fracture (Multiple) several years ago. (See Fig.)

X-RAY PELVIMETRY

Inlet	A. P.	12.5
	Trans.	11.5
Mid Pelvis	A. P.	12.5
	Trans.	9

7-7-51 — Breech — Elective Section — Boy 6-11

If a patient has had an injury to the diaphragm or a hernia of the diaphragm which has been successfully repaired, the termination of her pregnancy presents a problem. We know that the diaphragm ascends in the latter months of pregnancy and that, in all probability, it receives a great deal of increased strain during labor. Like a cesarean scar, the fact that the repaired diaphragm holds through one labor does not mean that it will a second or a third. Mengert[10] has seen one of these patients die during a following labor and is of the firm conviction that these patients should be sectioned.

CASE.—Mrs. A. — gravida I, para 0. History of auto accident in February, 1942, with crushing injury because of a truck passing over her abdomen. In shock for several hours. Diaphragmatic injury repaired. Fracture of descending ramus of pubis on left. Premature labor at 7 months, 6-14-47. Because of a small baby, I permitted her to labor and she was delivered by breech extraction of a 3-lb. baby which died neonatally of intracranial hemorrhage. Since then, she has been delivered at term in another city by cesarean section.

SUMMARY AND CONCLUSIONS

1. Problems pertaining to travel and motoring during pregnancy have been discussed
2. The safest place for the patient during pregnancy is in a radius of a few miles from home.

3. Traumatic Abruptio Placentae of the severe type and ruptured uterus often cannot be differentiated and when either is suspected active operative treatment should be the rule after shock therapy.
4. Smaller injuries of the pregnant uterus demand cesarean section and repair or removal of the uterus depending on the extent of the trauma.
5. Lesions of the abdominal viscera, with the uterus intact, should be repaired and the pregnancy undisturbed.
6. In pelvic fractures near term and with old pelvic fractures, each case must be individualized.
7. In case of previously repaired injury or hernia of the diaphragm, cesarean section is advisable.

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DISCUSSION

Dr. Samuel A. Cosgrove, Jersey City, New Jersey.—As usual Dr. Gustafson has presented us with a well-rounded and thoughtful consideration of his subject, wisely refraining from attempting any actual statistical approach. His case reports are well selected and his comments logical and temperate.

One's general impression from the large number of injuries he reports might be that perhaps automobile driving in the Middle West is a little more cowboyish than in the effete and traffic-congested East. It is a little difficult to see just why he includes a case which aborted presumably as a result of a railroad train trip, or why the automobile should be specifically blamed for a woman having committed suicide by gunshot in one which she could have just as advantageously carried out at home or sitting on a park bench.

All Dr. Gustafson's material is concerned with injuries to patients riding in or driving automobiles. The automobile should in addition be charged with those accidents involving pedestrians struck by them. Such pedestrians if pregnant will, of course, sustain any of the injuries described by him and their significance would be the same as in the cases he discusses. One of the worst abruptions I have ever seen was in a woman who got considerably lit up in a lady-like way, of course, on Christmas Eve, in which condition she somewhat carelessly placed herself in the path of a speeding car.

One would subscribe unhesitantly to the conclusions which the essayist has arrived at. While the many injuries described by him demand considerable judgment in their handling, the most frequent and almost daily demand on the obstetrician is for advice as to the safety of pregnant women indulging in auto-

mobile travel. They all want to have their cake and eat it too. They want to take the automobile trips, but have the doctor assure them that there is no danger in doing so. This, of course, he cannot do. It is true, as stressed by Diddle, that especially during the war and since thousands of women followed their men all over the world by all methods of travel, with apparent impunity. But I, probably like each of us, have seen many cases where abortion, as in Dr. Gustafson's observation, has immediately and apparently consequentially followed automobile trips of greater or less length. Some of these might of course be discounted on the basis of the "post hoc propter hoc" fallacy. But they can hardly all be. It may also be true that, as Diddle and Greenhill contend, such abortions would have occurred anyway, and the automobile ride just happened to be the trigger which precipitated the inevitable. But when a doctor consents to the pulling of the trigger he is often embarrassingly held responsible for the apparent consequences of his complacency. My own practice, which I think is safest for all of us, is to be pretty hardboiled in refusing to even tentatively consent to the safety of such travel during any period of pregnancy.

Dr. A. W. Diddle, Knoxville, Tennessee.—Most would agree with Doctor Gustafson's conclusion. On the contrary, it is not clear to me and therefore, it is suspected may not be clear to others, as to whether or not the first eight case histories were regarded as examples of abortion induced by travel or examples of abortion concurrent with travel. This difference bears comment. Abortion not uncommonly is assumed to be caused by riding when uneventful or trivial mishaps during travel precedes or is concomitant with the abortive process. Under this circumstance the relationship may be used as basis for litigation. Doctor Hubert W. Smith, Professor of Medico-Legal Medicine at the University of Illinois, communicates there is considerable amount of imposition and abuse in personal injury actions based on alleged traumatic interruption of pregnancy. Two recent case histories are given as illustration. One woman five months pregnant was in a minor automobile collision. She ceased to feel fetal movements and aborted a dead fetus at the sixth month of pregnancy. Autopsy examination showed agenesis of the fetal brain. Another woman ceased to feel fetal movements about six weeks after a Greyhound Bus struck a car in which she was riding. She suffered nothing other than fright at the time. Both women made claims that fetal death and premature deliveries resulted from the accident, but clinically that appeared untrue. Nevertheless, legal fees cost the defendants several hundred dollars.

The claim agents of 39 major railroads and union stations collected data from their files for me in 1947 to 1948. It was their experience that nine times out of ten the railroad companies had to make a settlement in favor of the patient if litigation was based on early interruption or complication in pregnancy arising during or after a ride in, or collision with, one of their conveyances. This was true even though complications were delayed several days or weeks. Settlement commonly had no relationship to severity of trauma sustained.

Three observations have led me to continue to feel that average automobile rides ordinarily play little part, if any, in producing abortion: (1) Several thousand gravid women have traveled distances varying from 50 to 350 miles by automobile to the University of Iowa Hospital without unusual mishaps. (2) Diddle, Jack and Pearse were unable to prove a relationship between abortion and the average modern means of travel during World War II. (3) In their own practice O'Connor and Diddle noted no apparent increase in the incidence of

premature delivery among women who travel considerably as contrasted to those who travel little or not at all. The principal problem of automobile rides and pregnancy is regarded as procurement of hastily mobilized obstetric care should complications unrelated to the ride arise while traveling.

I have seen only one pregnant woman who was seriously injured in an auto accident. She sustained generalized injuries and died. Yet, postmortem examination showed the baby had no bruises or fractures and the placenta and membranes were intact. All of us are aware that the bony pelvis usually serves to protect the pregnant uterus in the first trimester. Later in pregnancy the amniotic fluid usually cushions a direct blow. On the contrary, the essayist has shown that if a uterine injury is produced it may be severe, require heroic treatment of the patient, and may be accompanied by fetal injury or fetal death.

The City of Knoxville, Tennessee, serves as the medical center for more than a half million people. In this community, orthopedists are seeing an annual average of 12 to 15 women below the age of 40 years with pelvic fractures suffered in auto accidents. Although the number of obstetric patients having previous pelvic fractures are unknown, these figures indicate the potential obstetric problem in this city. In instances studied personally with respect to future obstetric prognosis, pelvic portrayal, as described by Eller and Mengert, has proved helpful and is recommended to ascertain the contour and capacity of the various pelvic planes.

Although extrinsic trauma was not a factor, the story of two pregnant women dying with incarcerated, diaphragmatic hernia are given to emphasize the hazard of this combination and to fortify the essayist's contention that pregnant women with diaphragmatic hernia should not be allowed to labor. One woman (Diddle, A. W. and Tidrick, R. T.: Am. J. Obst. and Gynec., 41:317, 1941) died in the second stage of labor. Recently another was seen as an emergency consultation with a history of increasing respiratory disturbance and thoracic pain during pregnancy. The patient was eight lunar months pregnant but not in labor. Thoracotomy showed gangrenous herniated bowel in the thorax. The woman died.

DR. GERALD W. GUSTAFSON, Indianapolis, Indiana (closing).—I simply want to thank the discussants very much. I do feel that because of the number of reports on safety of travel which have appeared in the literature in the past few years that it is wise for us to put the brakes on somewhat because there has been too much tendency to allow the patient to travel. Personally, I think it cannot be done without some danger.

Thank you very much.