Intrahepatic Cholestasis of Pregnancy

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Course Description:

This course focuses on participants gaining a better understanding of Intrahepatic Cholestasis of Pregnancy (ICP), early recognition of women affected by this condition, and the issues it brings to a woman and her unborn fetus.

Approximate Time to Complete: 55 minutes

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Objectives

The course will:

- Help the participant develop sound clinical judgment in the delivery of health care in a labor and delivery unit and postpartum when concerns are suspected in regards to Intrahepatic Cholestasis of Pregancy (ICP).
- Expand participant's knowledge base on learning theories and their instructional implications regarding health care delivery in a labor and delivery unit and postpartum when ICP is questionable.
- This will allow for rapid implementation of the necessary steps needed when fetal well-being is questionable.
- Enable the participant to convert proven learning into actual health care delivery.

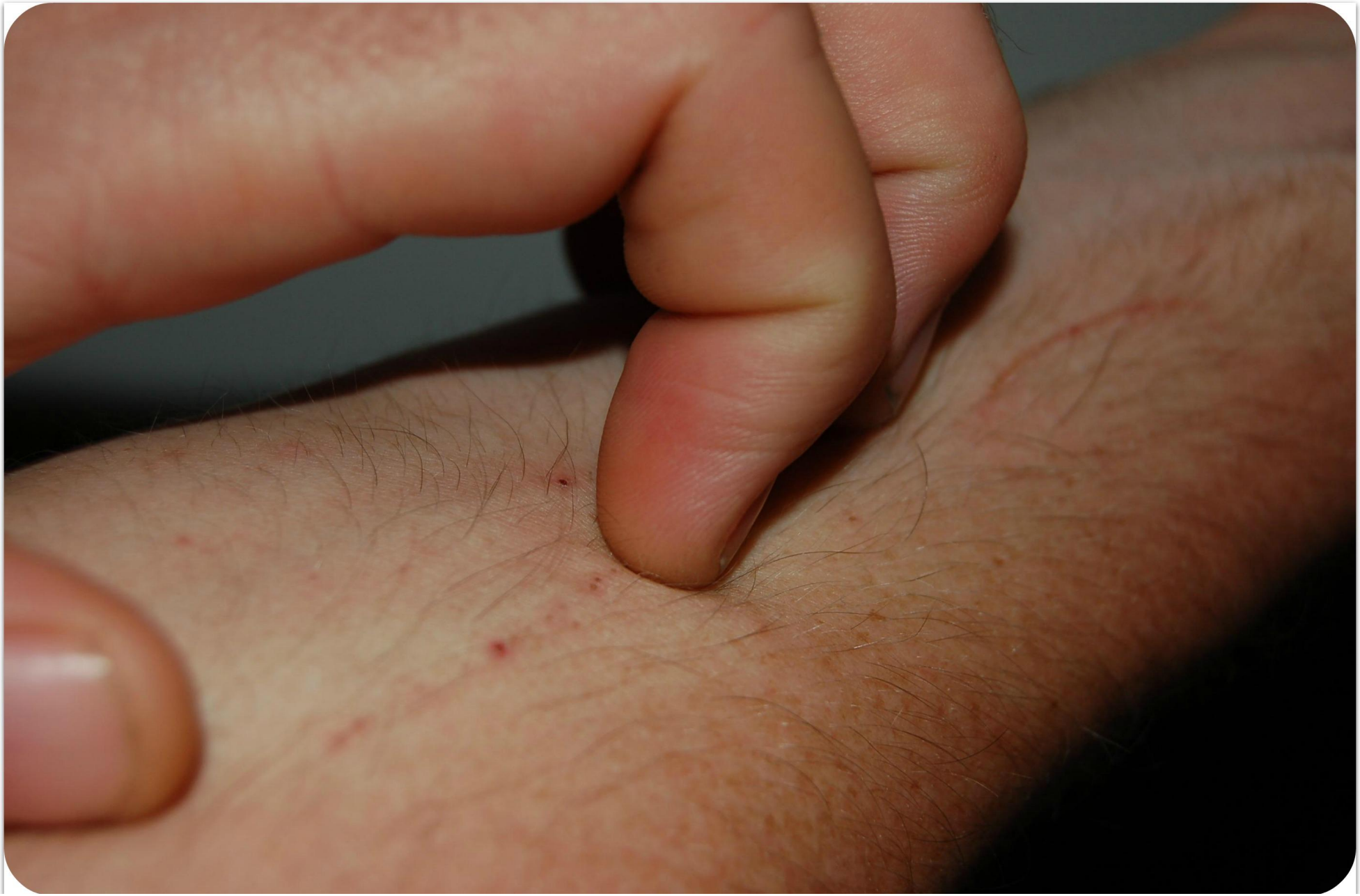
This is Tamara, Ken, Juanita and Michael.

- Tamara will take you through the basics.
- Ken will take you through the patient presentation and physical exam.
- Juanita will take you through diagnosing ICP.
- Michael will take you through patient management.

Intrahepatic Cholestasis of Pregnancy (ICP) Definition

Women who present with ICP have pruritus and elevation in serum bile acid concentrations. This condition generally develops in the late second and/or third trimester of pregnancy.

ICP rapidly resolves following delivery.



ICP Incidence Rate and Epidemiology

ICP is the most common liver disease exclusive to pregnancy [1].

The incidence rate varies worldwide, from <1 to 27.6%. There are no known reasons for the variance in rates [2, 3]. It is thought the differences among population groups and environmental factors may contribute to the incident rates [4, 5].

ICP Incidence Rate and Epidemiology

It is not clearly understood, but the disease commonly occurs in the winter months in the countries of Sweden, Finland, and Chile [2].

In a study performed in Chile, ICP occurred at a higher rate in multiple gestations; twins 20.9% while in single gestation 4.7% were affected [9].

In a Finland study, ICP occurred in 43% of triplet pregnancies versus 14% of twin pregnancies [10].

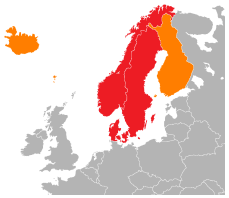
Sweden Finland Chile

Finland - Single Color by FreeVectorMaps.com

In Chile, 27.6% of Araucanos Indians are affected with ICP, representing the highest incident rate worldwide [4].

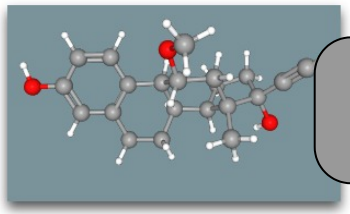
This rate is followed by the Indian-Asians and Pakistani Asians, with an incident rate of 1.2 to 1.5% [8].

In Europe, 0.5 to 1.5% of Scandinavia women are affected [2].



In the United States, the occurrence rate is from 0.32% of women in Bridgeport Hospital, Connecticut to 5.6% in a Hispanic population in Los Angeles, California [6, 7].

Genetic Susceptibility



Hormonal Factors

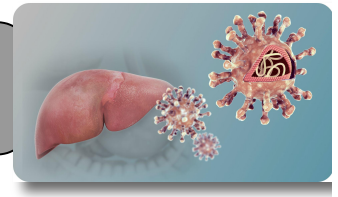
Environmental Factors

The etiology of ICP is not clearly understood; however, a combination of the following risk factors are suspected:

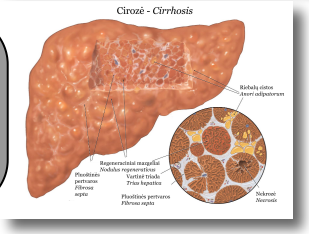
National Center for Biotechnology Information. PubChem Database. Moxestrolum, CID=71714, https://pubchem.ncbi.nlm.nih.gov/compound/Moxestrolum (accessed on Nov. 10, 2019) Source link

Other factors that affect the incident rate include: [11]

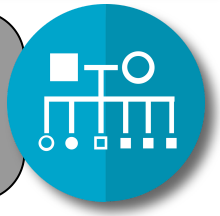
Personal history of chronic hepatitis C



Personal history of nonalcohol liver cirrhosis



Prior personal history or family history of intrahepatic cholestasis



Advanced maternal age

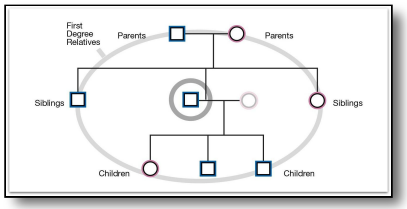
A woman who has had ICP has a 60 to 70% risk of recurrence in subsequent pregnancies. The severity varies in subsequent pregnancies.

Etiology - Genetic Susceptibility

The genetic cause of ICP is very complicated, but genetic susceptibility in evidence demonstrates [12]:

Familial Clustering

Increased risk in first-degree relatives



Increased risk in some ethnic groups

Recurrence rate of 60-70% in subsequent pregnancies

Etiology - Genetic Susceptibility

PFIC3 is a familial form of ICP and has been associated with the adenosine triphosphate-binding cassette, subfamily B, member 4 (ABCB4) gene encoding the multidrug resistance 3 (MDR3) protein [13].

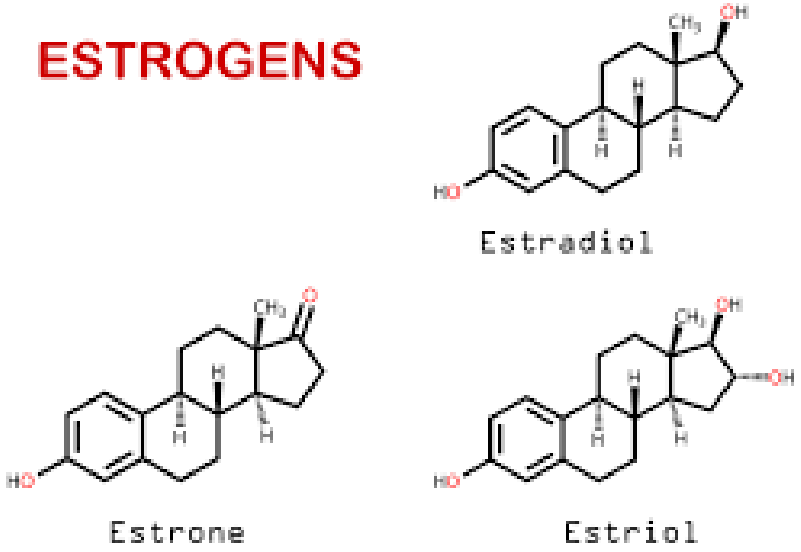
- 16 percent of Caucasian patients with ICP have the ABCB4 gene mutation [22].
- Numerous heterozygous mutations in the ABCB4 gene were reported in women with ICP [16-21].
- In a consanguineous family, a woman having ICP is more likely to have a heterozygous mutation in ABCB4 (also called MDR3) [14, 15].
- Other genes possibly involved in ICP pathogenesis include ABCB11, ATP8B1, ABCC2, NR1H4) [16, 17, 18, 19, 20, 21, 22, 23].

Etiology - Hormone Effect in ICP

Estrogen [9, 27, 28]

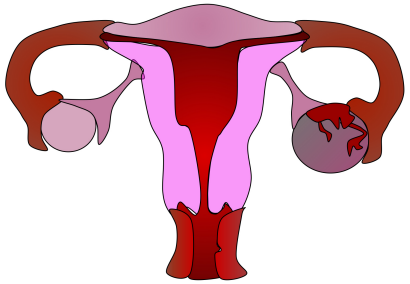
In experimental and clinical studies, estrogen has been associated with ICP.

- Serum estrogen reaches peak levels in the second half of pregnancy when ICP is noted to occur.
- Serum estrogen levels are higher in multiple gestation when compared to singleton pregnancies. This supports findings that ICP occurs at higher rates in multiple gestation.

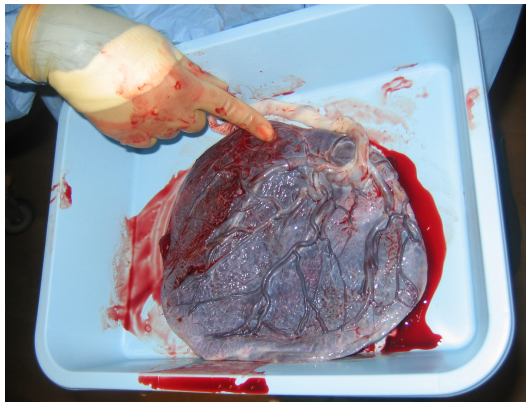


Etiology - Hormone Effect in ICP

ICP has been seen earlier in pregnancy following ovarian hyperstimulation, probably related to the considerably high serum estrogen level.



The placenta is the major source of estrogen production during pregnancy in the second and third trimester, so ICP resolves after delivery of the placenta.



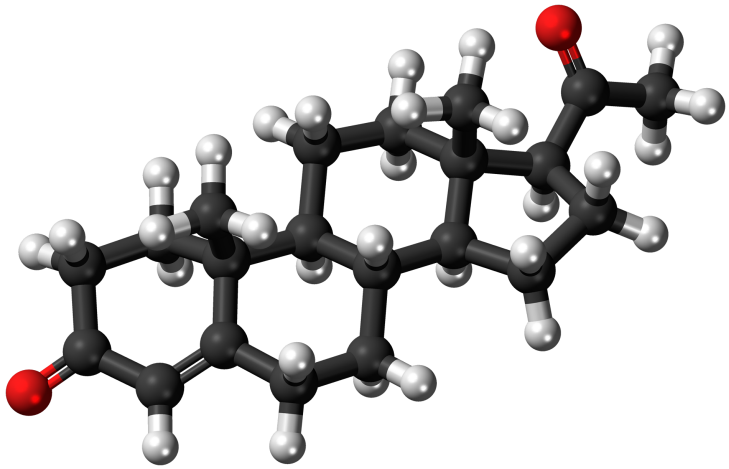
Etiology - Hormone Effect in ICP

Progesterone metabolism may contribute to the pathogenesis of ICP.

Progesterone

- In women who are genetically predisposed, the development of large amounts of sulfated progesterone metabolites in pregnancy and may result in saturation of the hepatic transport system used for biliary excretion of these compounds [29, 30]. This may be associated with greater 5-alpha and 3-alpha reduction [29, 30].
- Sulfotransferase activity is decreased in pregnancy [31].

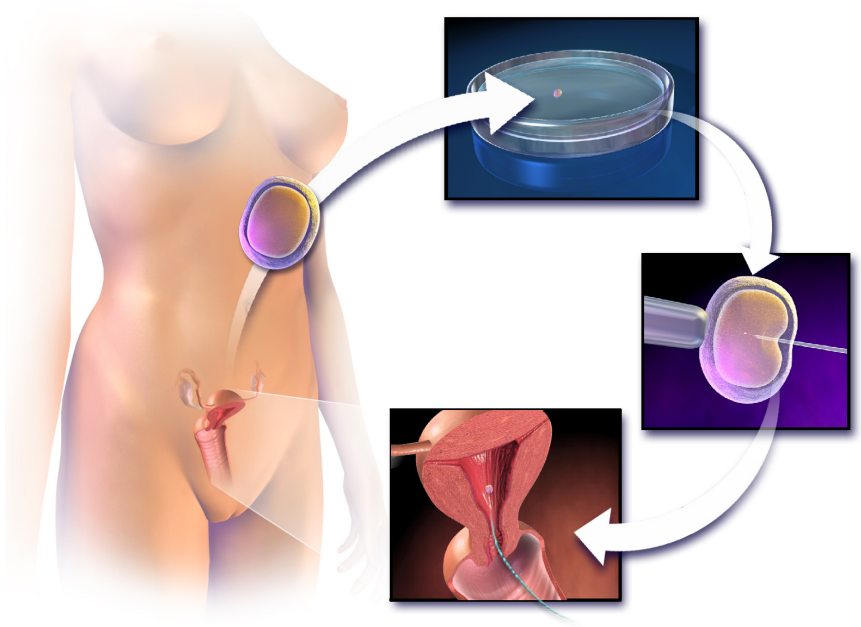
Etiology - Hormone Effect in ICP



Progesterone molecule

- It is not known if administration of exogenous progesterone during pregnancy increases the risk of ICP.
- Progesterone supplementation for reducing the risk of spontaneous preterm birth (PTB) was not associated with an increased rate of ICP in a placebo-controlled randomized trial. In addition, the package insert indicates contraindications to use of Makena including an 8 percent increase of pruritis in users. In addition, package insert indicates contraindications to use include Makena includes cholestatic jaundice of pregnancy, benign or malignant liver tumors, or active liver disease [32].

Etiology - Special Populations and Hormone Effects



Transient symptoms of cholestasis may be seen in women with a history of cholestasis undergoing ovarian stimulation for in vitro fertilization due to high estrogen levels. Data on occurrence rates is limited to case reports [27].

Etiology - Special Populations and Hormone Effects

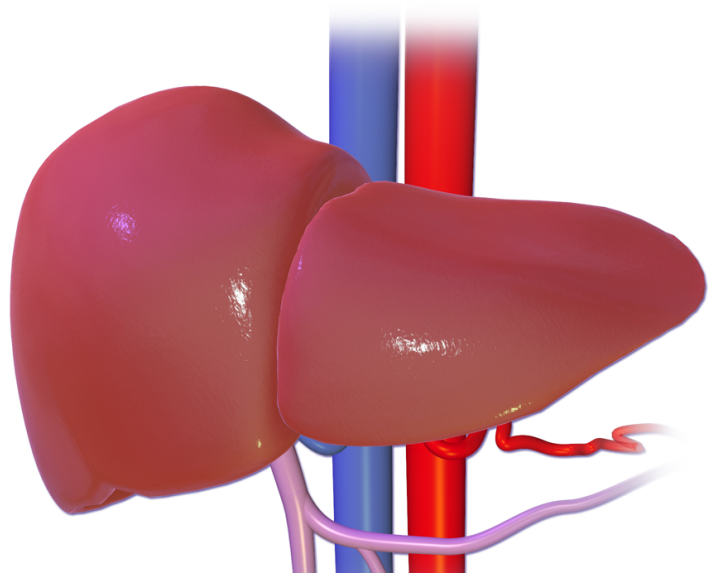
- It is uncertain if providing progesterone supplementation to women with a history of previous preterm birth (PTB) or a short cervical length in the current pregnancy should be avoided if she has a previous history of ICP.
- Progesterone supplementation risks include a PTB in the current pregnancy, the gestational age of a recurrent preterm birth with or without progesterone supplement, and the risk and possible ramification of recurrent ICP.
- If progesterone supplementation is initiated and she develops ICP, it is recommended the medication be discontinued.

Etiology- Environmental Factors in ICP

- Seasonal and geographic variables influence the expression of this disease.
- Definite aspects in the environment have not been identified. Low selenium levels related to dietary deficiency and low vitamin D levels due to lack of sunlight exposure have been suspected causative factors [11, 33].

Etiology - Underlying Liver Disease

- Liver disease has been identified in a small number of women who develop ICP [34-37].
- Hepatitis C and nonalcoholic liver cirrhosis were associated with ICP in a large population-based study [35].
- In another review, four sisters had an atypical familial form of prolonged recurrent ICP during pregnancy and developed progressive fibrosis [36].



ICP Patient Presentation

Women with ICP may present with mild to unbearable pruritus. Pruritus may be generalized, but usually starts on the soles of the feet and the palms of the hands.

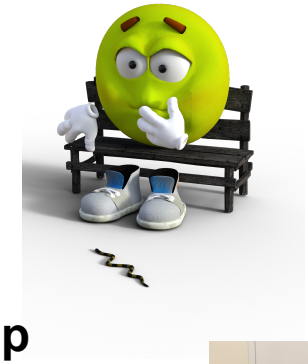
Pruritis is usually worse at night.

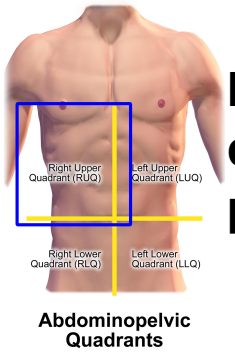
ICP Patient Presentation

Other ICP symptoms that may occur include:

Click on the pictures for the symptoms of ICP.

Nausea





Abdominopelvic Quadrants

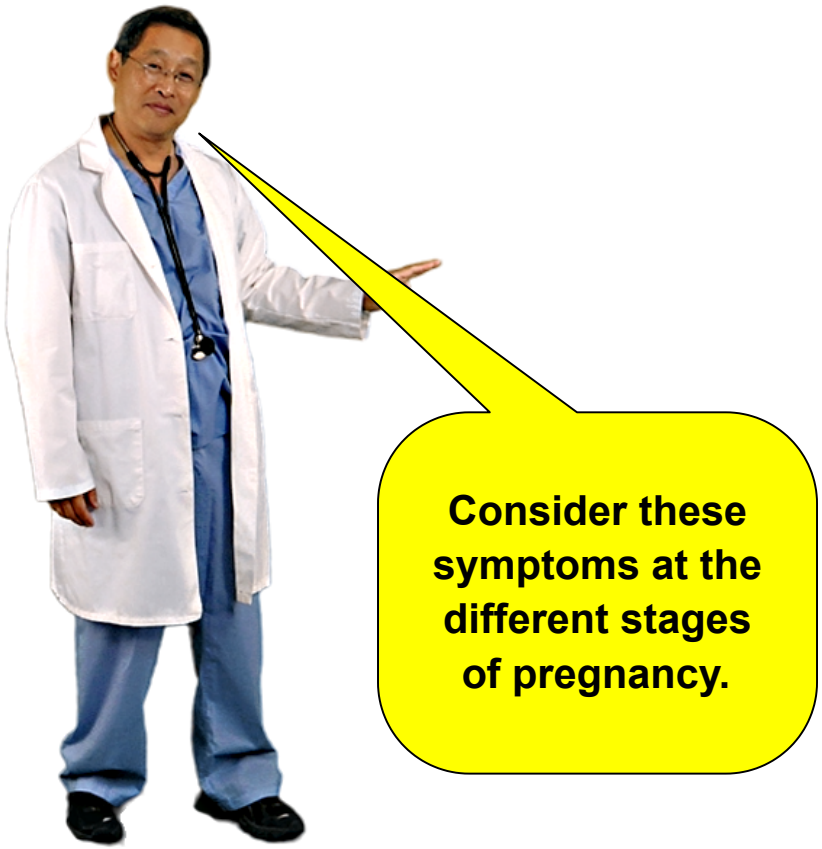
Right upper quadrant pain

Sleep Deprivation

Oily Stools

Poor appetite

ICP Patient Presentation



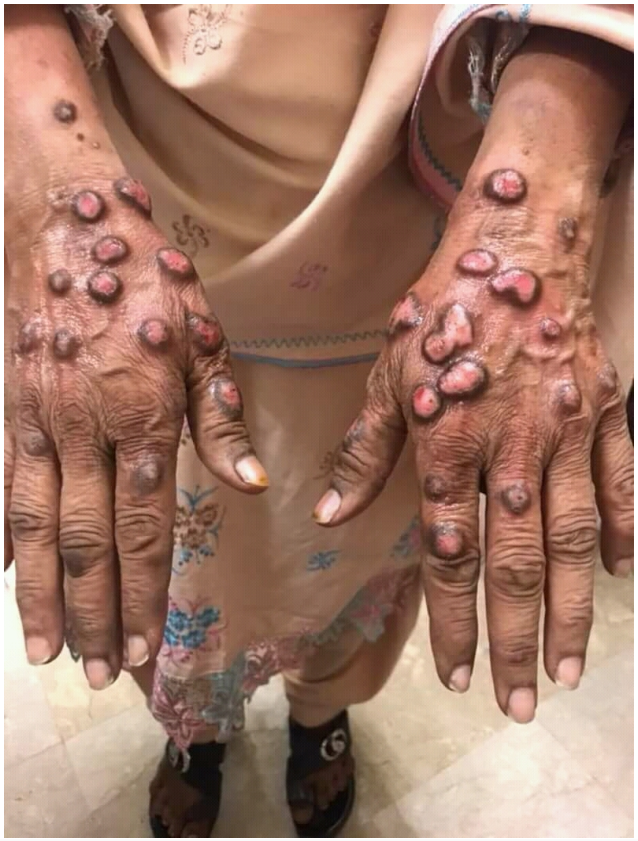
- Symptoms of ICP may be transient in the first trimester in women who have encountered ovarian hyperstimulation after in vitro fertilization [28].
- Symptoms that are persistent and worsening occur in women who have naturally conceived [38].
- Pruritus and other symptoms usually develop during the late second or third trimester.
- The causes of liver disease should be evaluated in women who develop encephalopathy or other stigmata of liver failure.

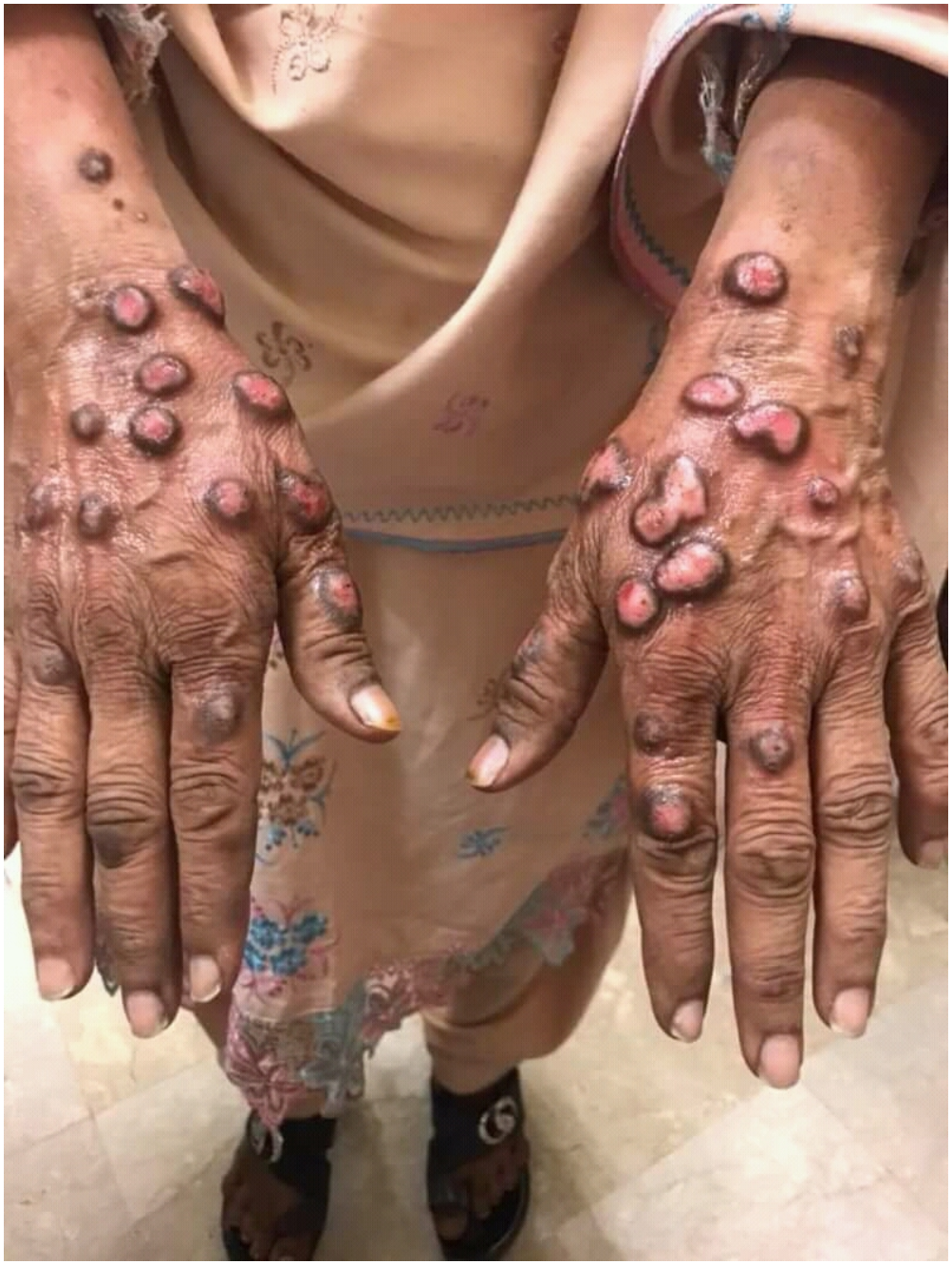
ICP Physical Examination

Women with pruritis may present with scratch marks and excoriations.

Prurigo nodules may occur secondary to scratching.
No primary skin lesions are associated with ICP.

Click on the picture for a larger view.

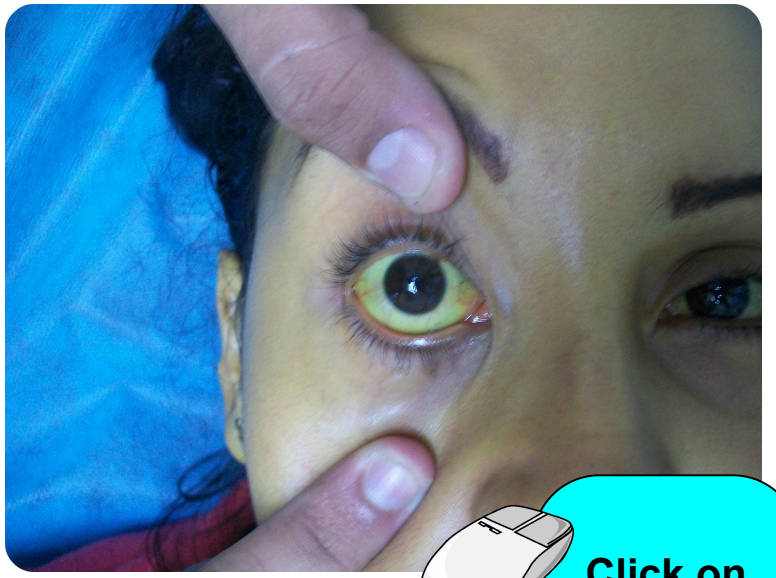




ICP Physical Examination

In women with ICP, 14 to 25 percent will develop jaundice. Jaundice generally develops one to four weeks after the itching begins [39].

Other causes of jaundice should be determined if there is no pruritus.



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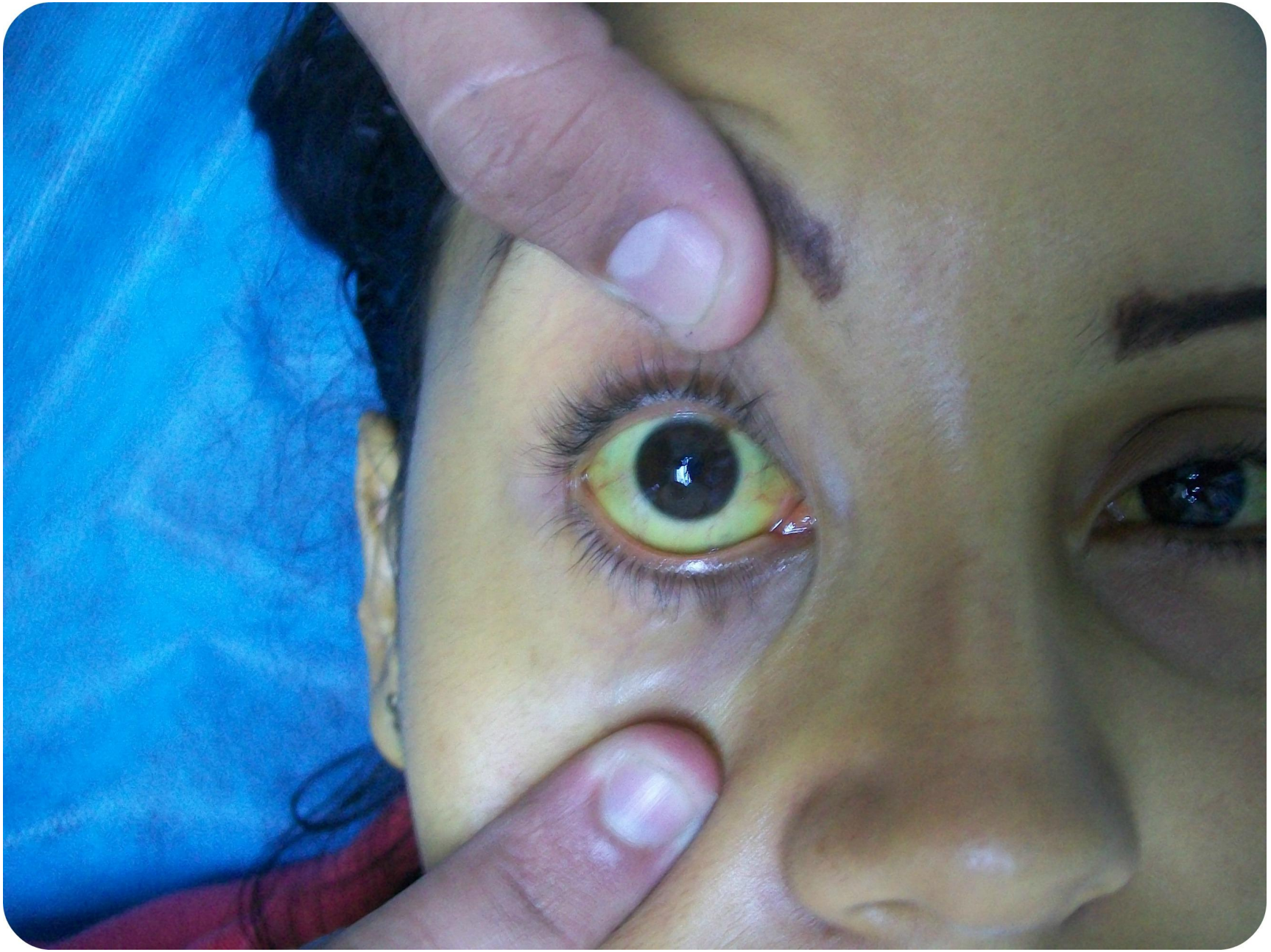


ICP Laboratory Findings

The normal physiological changes that occur in pregnancy must be considered when performing a workup of abnormal liver tests in a pregnant woman [108].

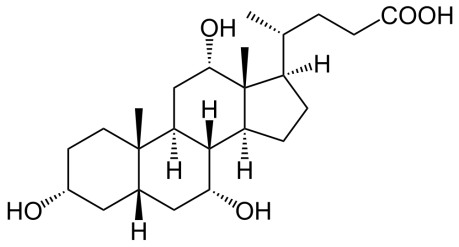
Click the silhouette for more information.

Over 90 percent of affected women will have an increase in total serum bile acid (TSBA) concentration. This is the key laboratory finding in ICP. Increased TSBA may be the only laboratory abnormality [32, 40, 41].

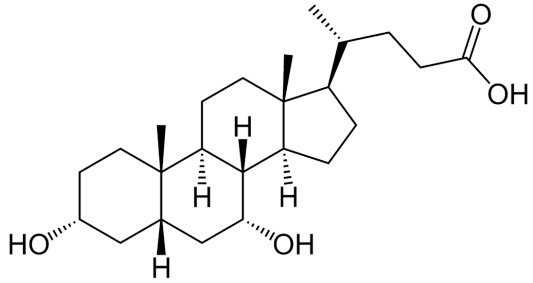
Pruritus may occur prior to laboratory abnormalities [42].

ICP Laboratory Findings

The normal physiological changes that occur in pregnancy must be considered when performing a workup of abnormal liver tests in a pregnant woman [108].



cholic acid



chenodeoxycholic acid

Cholic and chenodeoxycholic acids are the primary bile acids that are increased, but cholic acid increases more than chenodeoxycholic acid which causes an increased ratio [39, 44, 45]. A ratio of these two acids is not necessary to diagnose ICP [46].

Other possible laboratory findings include:

Click the rectangles to reveal.

Serum aminotransferases (AST) increases in 60 percent of cases. This increase is usually less than two times the upper limit of normal, but may reach levels over 1000 unit/L which should prompt evaluation of viral hepatitis [32].

Alkaline phosphatase may increase four times the normal value but is not specific for ICP as this may be elevated due to placental isoenzyme.

Twenty-five percent of ICP cases have increases in total and direct bilirubin concentrations. However, total bilirubin levels do not generally increase greater than 6 mg/dL.

Gamma-glutamyl transpeptidase (GGT) is normal or mildly increased in 30 percent of ICP cases. GGT levels align with other cholestatic markers in other forms of cholestatic liver disease helping to make the diagnosis of ICP or other causes for the increase.

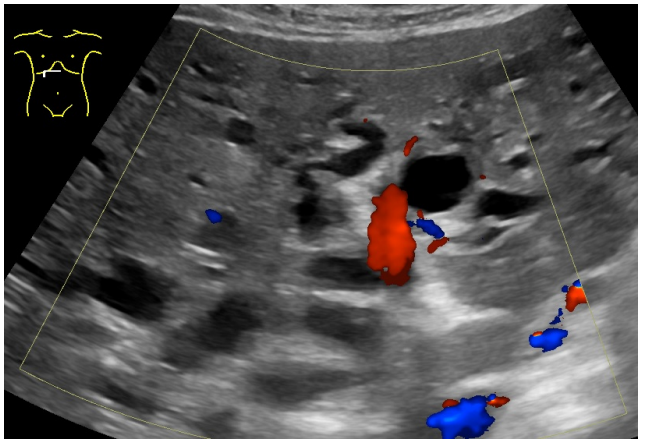
Prothrombin time (PT) is usually normal with ICP. When PT is protracted, it is usually secondary to vitamin K deficiency from fat malabsorption due to severe steatorrhea or secondary to use of bile acid sequestrants, instead of liver dysfunction [43].

Ultrasonography

Ultrasonography is not necessary in diagnosing ICP.

Women with ICP do not have abnormal findings on ultrasound.

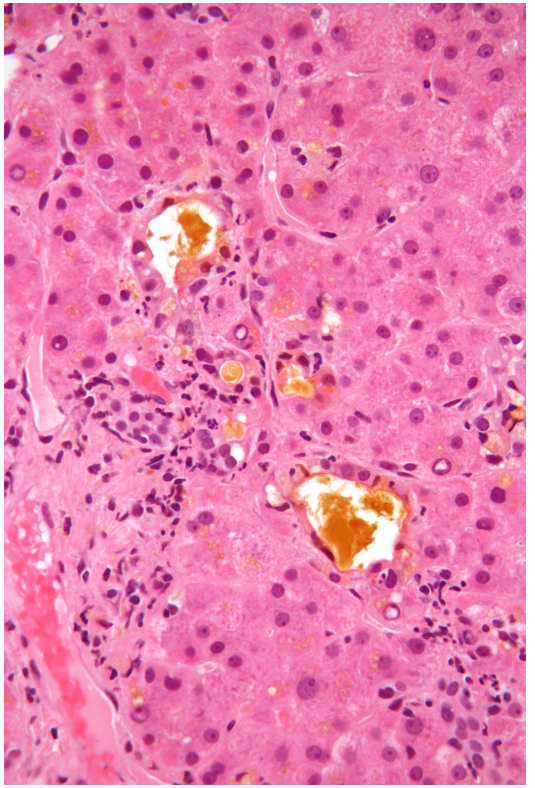
- Biliary ducts are not dilated.
- Hepatic parenchyma appears normal.



Ultrasound of dilated bile ducts

ICP Pathology

Histopathology is rarely available as liver biopsy is not necessary for diagnosis of ICP.



Cholestasis 2 - High Magnification

Differential Diagnosis

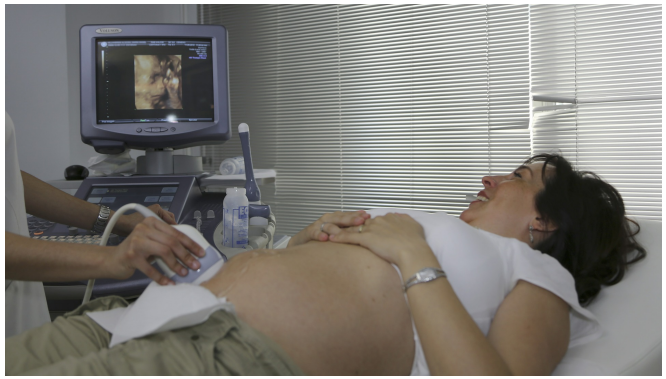
To rule in a diagnosis of ICP the following must be evaluated:

- History
- Physical exam
- Laboratory
- Total serum bile acids concentration (TSBA)
  - Alanine aminotransferase (ALT)
  - Aspartate aminotransferase (AST)

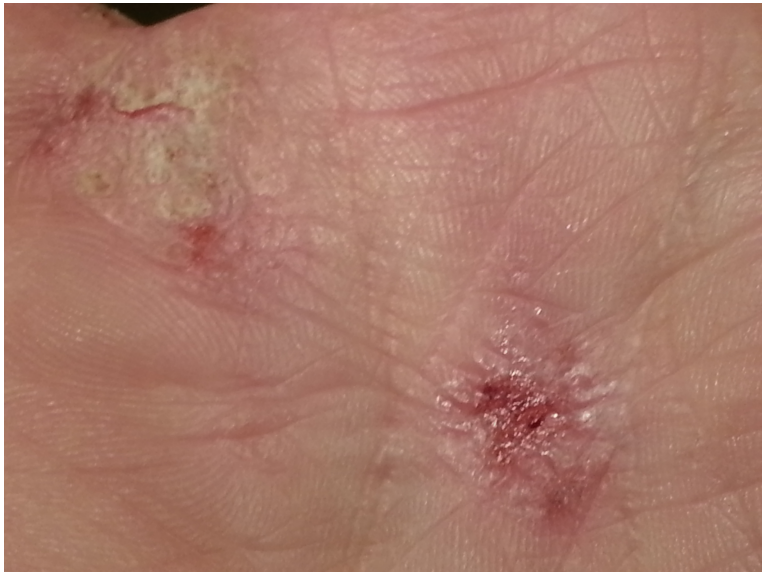
Differential Diagnosis

Pruritus and hepatic dysfunction possible causes:

- Pruritus gravidarum
- Atopic eruption of pregnancy
- Polymorphic eruption of pregnancy
- Pemphigoid gestationis
- Prurigo of pregnancy
- Pruritic folliculitis of pregnancy

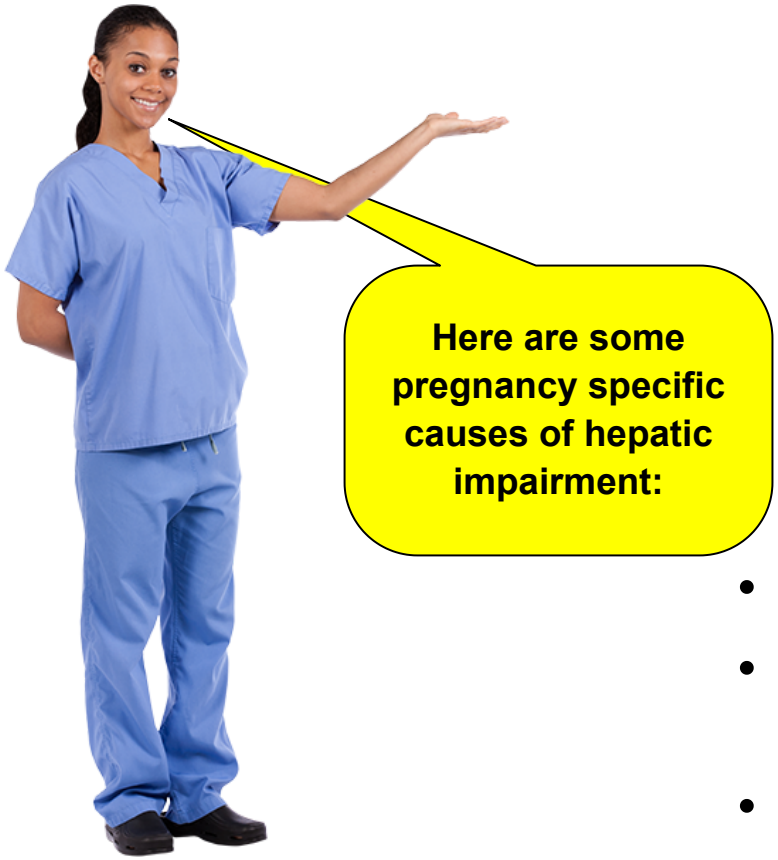


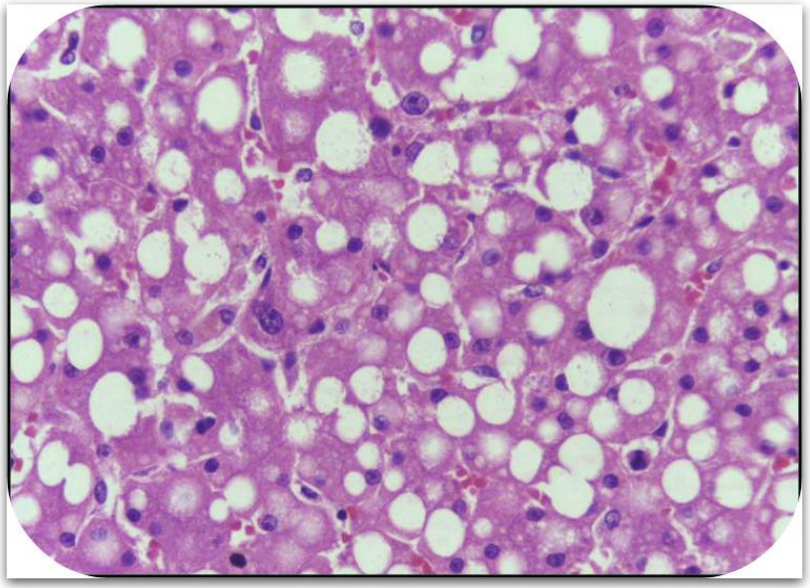
Differential Diagnosis



- Atopic dermatitis (shown above)
- Allergic or drug reaction
- Systemic disease

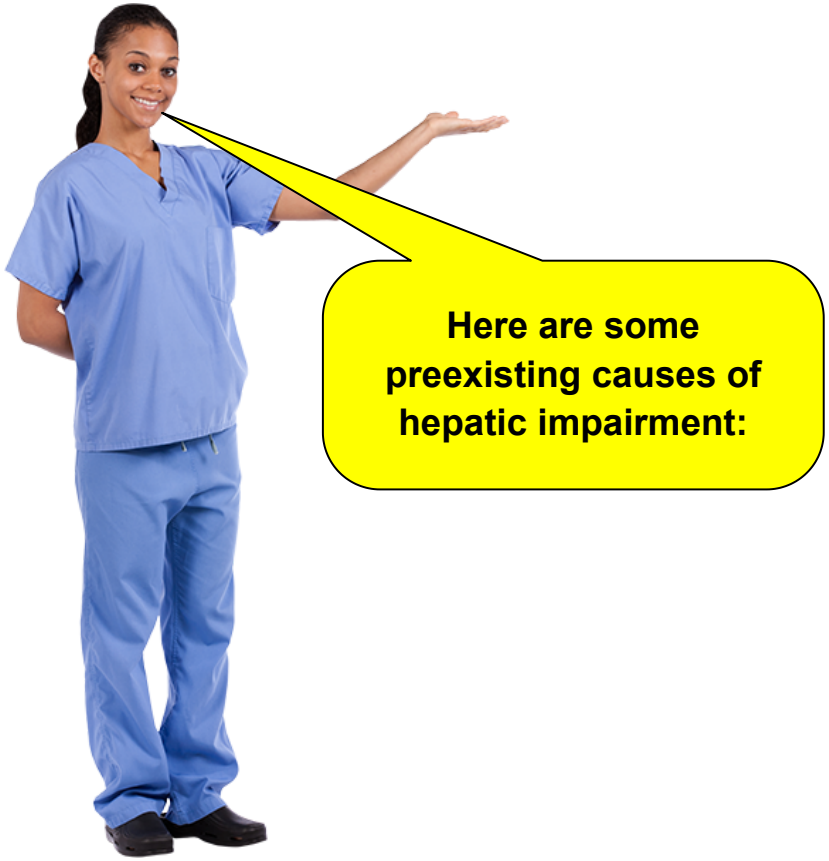
Differential Diagnosis

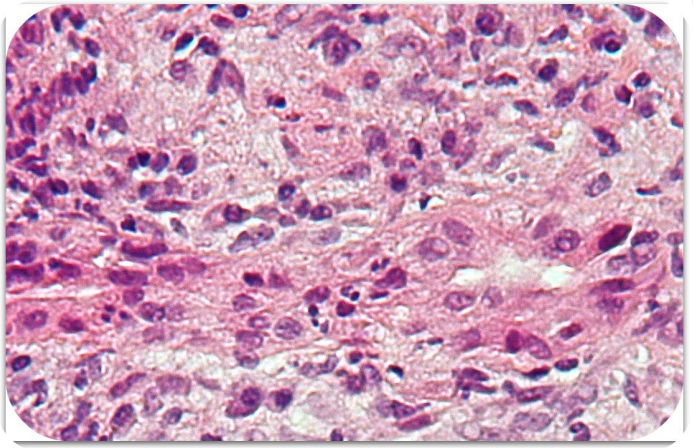




- Acute fatty liver of pregnancy (shown above)
- Hemolysis, elevated liver enzymes and low platelets syndrome (HELLP)
- Hyperemesis gravidarum

Differential Diagnosis

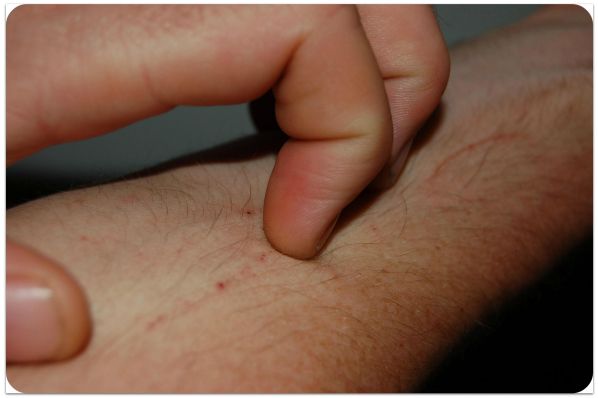




- Primary biliary cirrhosis (shown above) or primary sclerosing cholangitis
- Viral hepatitis
- Autoimmune hepatitis
- Drug-induced liver injury
- Biliary obstruction
- Venoocclusive disease

Differential Diagnosis

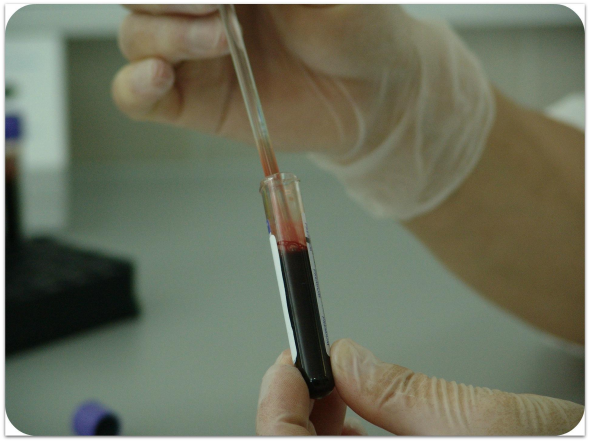
Pruritus occurs in 23% of pregnancies [52].



- Pruritus is the cardinal sign of ICP which does not support:
  - HELLP syndrome
  - Preeclampsia with severe features
  - Acute fatty liver of pregnancy
- ICP can however be associated with development of preeclampsia [53,54,55] and acute fatty liver of pregnancy [56].
- ICP does not present with primary skin lesions and helps distinguish it from:
  - Pregnancy-specific pruritic dermatoses
  - Skin conditions unrelated to pregnancy

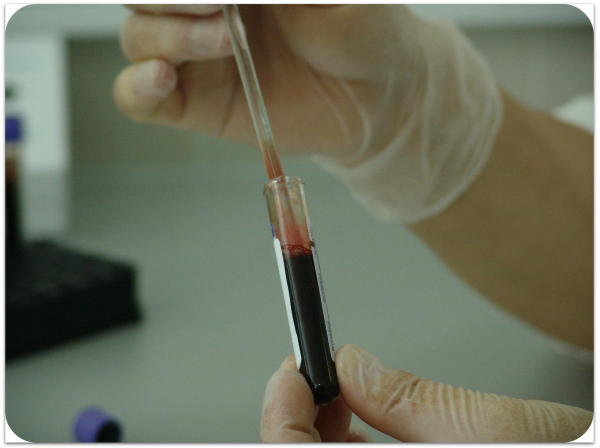
ICP Diagnosis

Here are some items to consider in diagnosing ICP.



- Diagnosis is based upon [109]:
  - Pruritus
  - Elevated TSBA levels
  - Elevated AST
  - Both elevated TSBA and AST with the absence of diseases that cause similar symptoms and laboratory results.

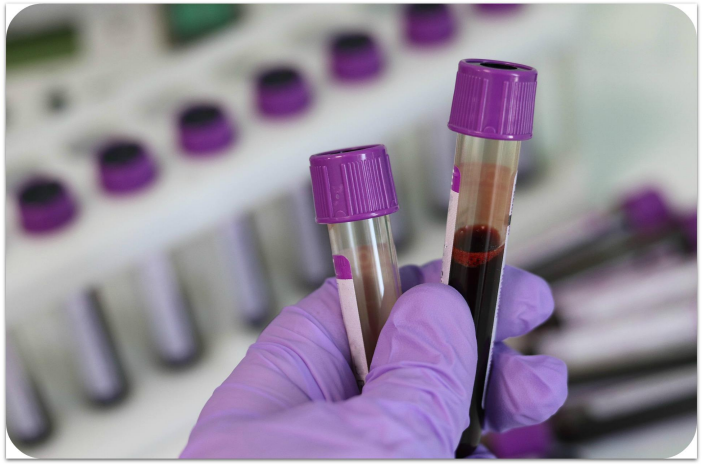
ICP Diagnosis



Diagnosis is based upon [109]:

- Pruritus
- Elevated TSBA levels
- Elevated AST
- Both elevated TSBA and AST with the absence of diseases that cause similar symptoms and laboratory results.

ICP Diagnosis



- Trimester specific reference ranges for TSBA should be used to determine if elevated.
- If trimester specific ranges are not available in the lab, then general population values are used.

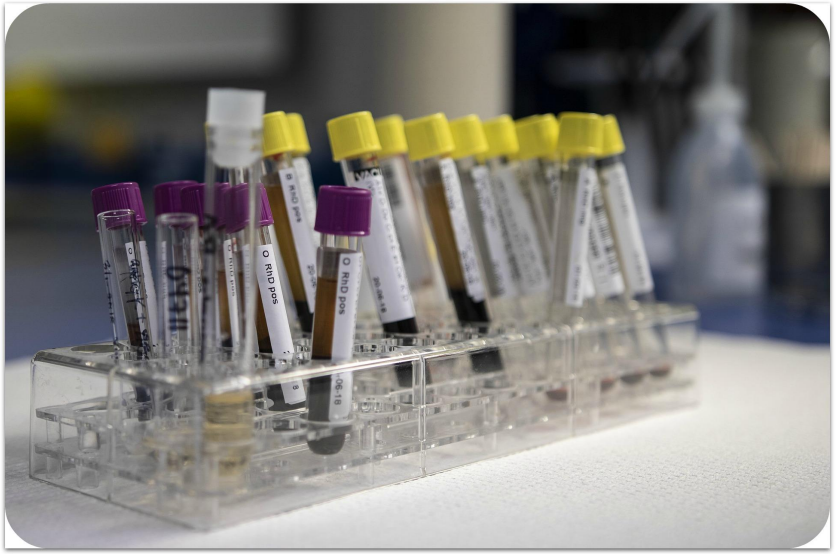
ICP Diagnosis

There are guideline variations in laboratory criteria; however, severe cholestasis is consistently defined as bile acids greater than 40 µmole/L and account for nearly 20% of cases [48, 49].

TSBA, with a cutoff level of 10 µmole/L, were evaluated in a systemic review of 11 studies. The sensitivity was 0.91 and specificity was 0.93 in this review. Uncertainty remains in the accuracy of TSBA in diagnosing ICP because most studies lacked a cross-sectional design that enrolled pregnant women [49].

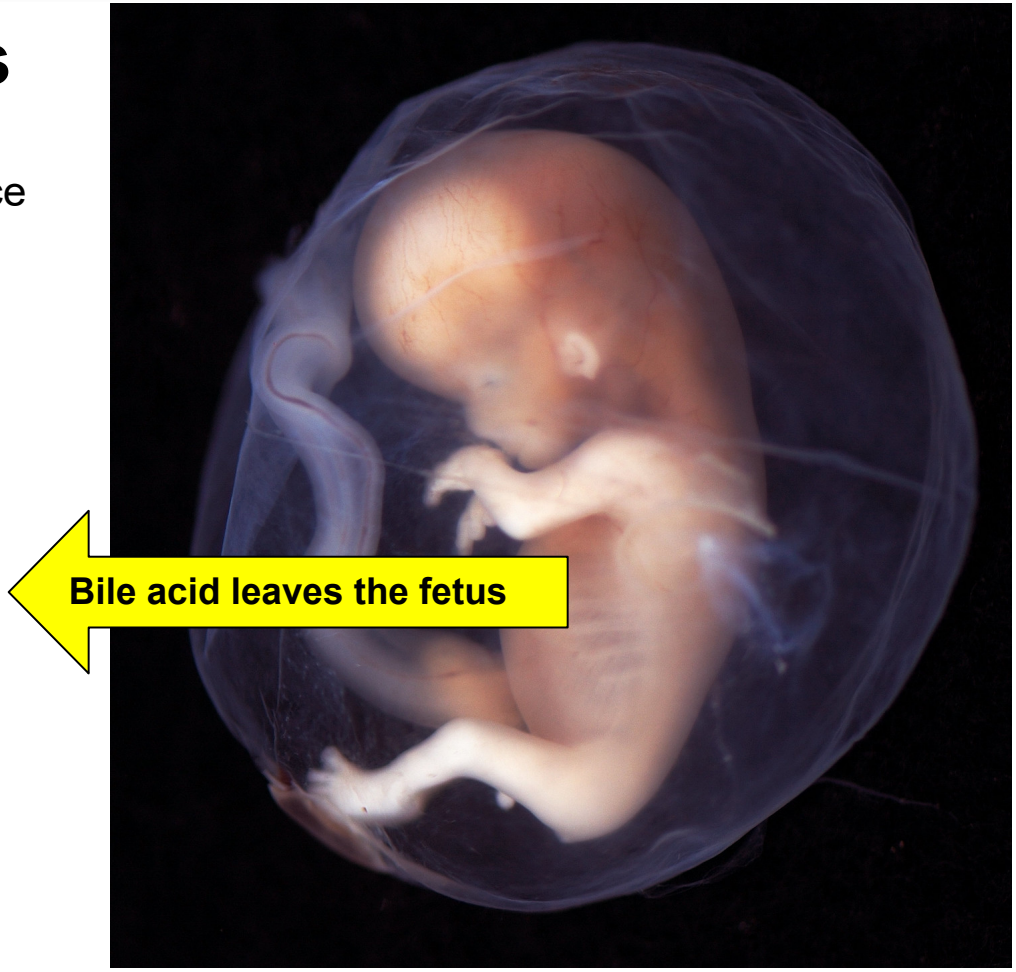
ICP Diagnosis

- TSBA ranges vary due to laboratory methods and are dependent on fasting levels which are lower than when she eats, population, and trimester age [50, 51].
- It is recommended to repeat laboratory tests weekly if total bile acid and aminotransferase levels are initially normal because pruritus can precede the rise in serum bile acids by many weeks.
- If Ursodeoxycholic acid (UCDA) is started based on pruritus, there may not be a noted increase in bile acid or AST levels.



ICP Fetal Complications

Transplacental gradients facilitate fetal clearance of bile acids in normal pregnancies [32, 57].



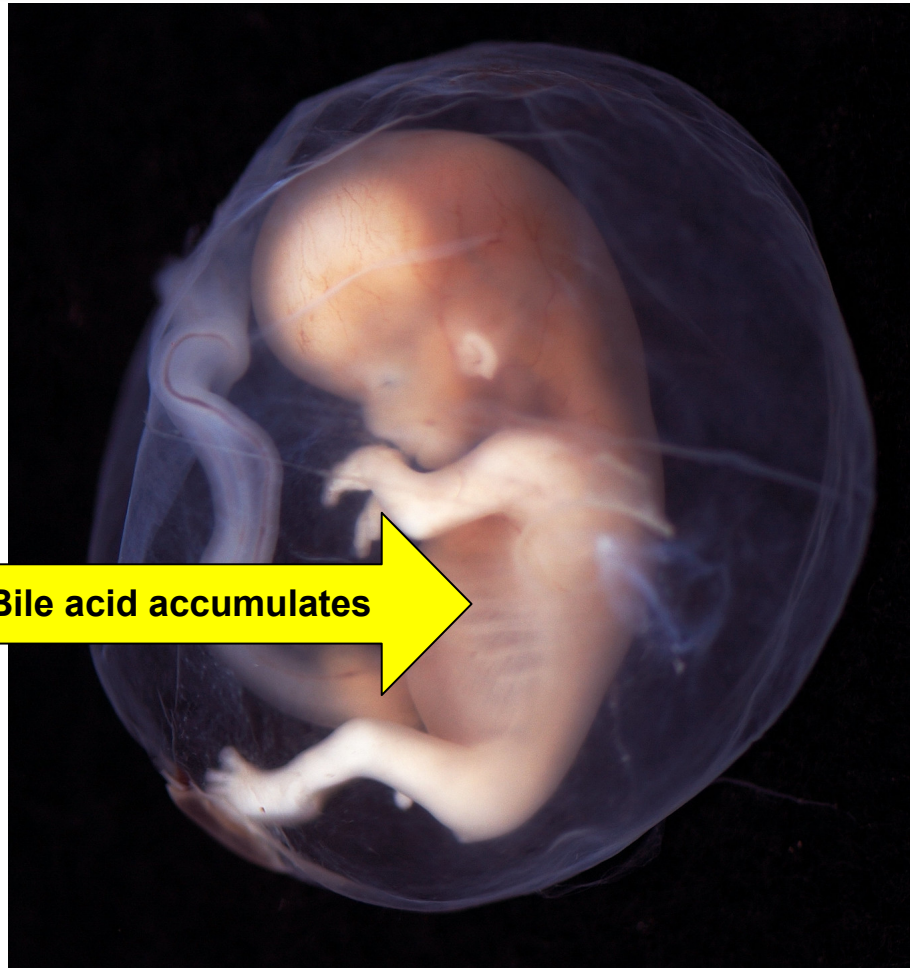
ICP Fetal Complications

Transplacental gradients facilitate fetal clearance of bile acids in normal pregnancies [32, 57].

In pregnancies affected by ICP, the transplacental gradient is reversed and an accumulation of bile acids occurs in the amniotic fluid and fetus [58].

In ICP there is increased risk for [59, 60]:

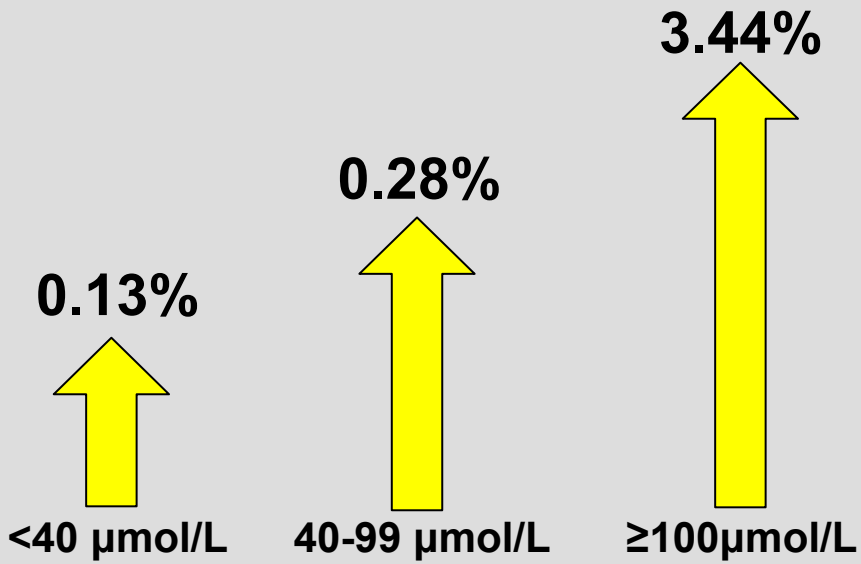
- Intrauterine fetal demise (IUFD)
- Meconium-stained amniotic fluid
- Spontaneous preterm birth
- Iatrogenic preterm birth
- Neonatal respiratory distress syndrome (RDS)
- Neonatal intensive care unit (NICU) admissions



ICP Fetal Complications

Fetal demise increases when the maternal bile acid level is higher, particularly when ≥100 µmol/L.

The arrows point to the risk of fetal demise based upon bile acid levels.



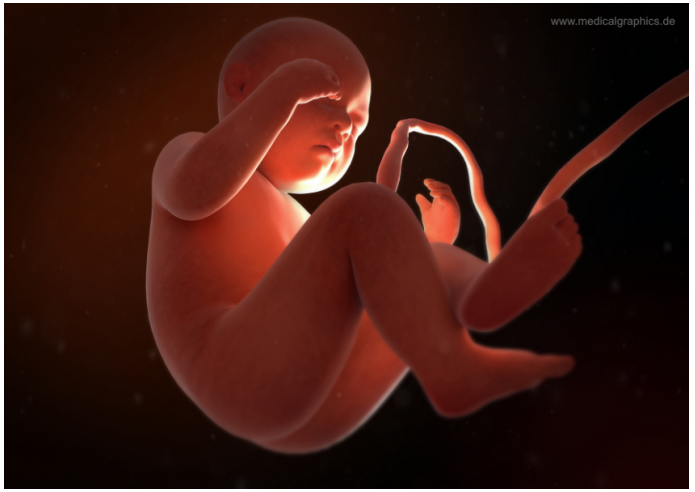
ICP Fetal Complications

- The rate of stillbirth increases with increasing gestational age, especially after 34 to 36 weeks.
- The role of early delivery is a factor in statistics as demonstrated by the high iatrogenic preterm birth rate in women with ICP.

ICP Fetal Complications

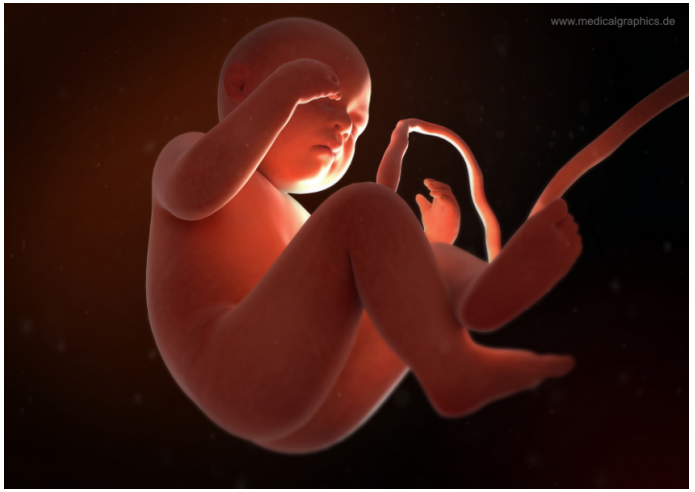
Fetal death in ICP is NOT clearly understood but is believed to be induced by high levels of bile acids causing:

- Sudden development of fetal arrhythmia [61]
- Vasospasm of the placental chorionic surface vessels [62]
- Concurrent pregnancy complications such as gestational diabetes or preeclampsia [63]



ICP Fetal Complications

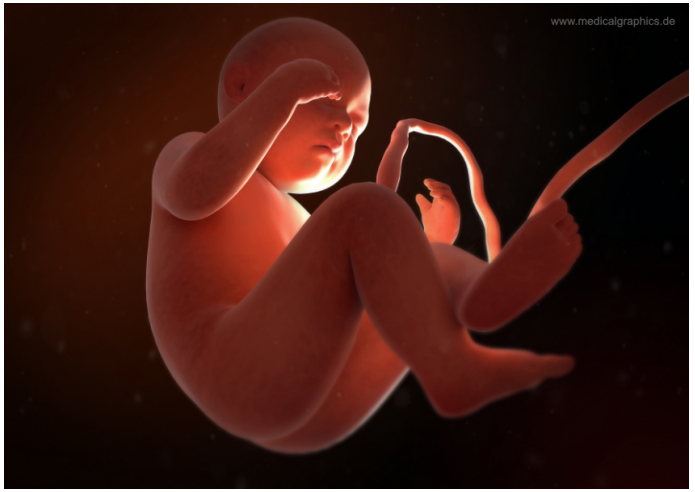
Bile acids increase expression of myometrial oxytocin receptors, which is believed to be associated with spontaneous preterm labor. These pregnancies also have an earlier onset of pruritus [64, 65, 66].



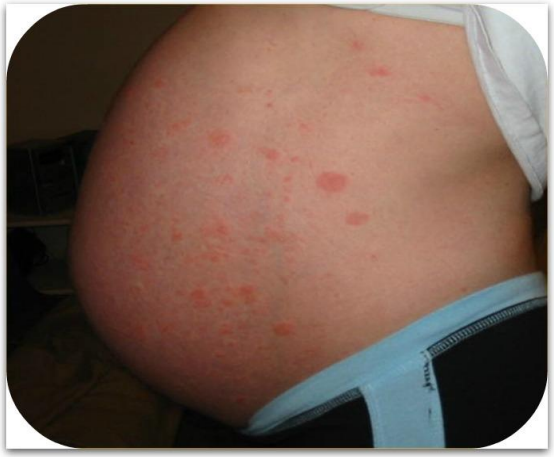
ICP Fetal Complications

Features not associated with ICP [32]

- Oligohydramnios
- Fetal growth restriction

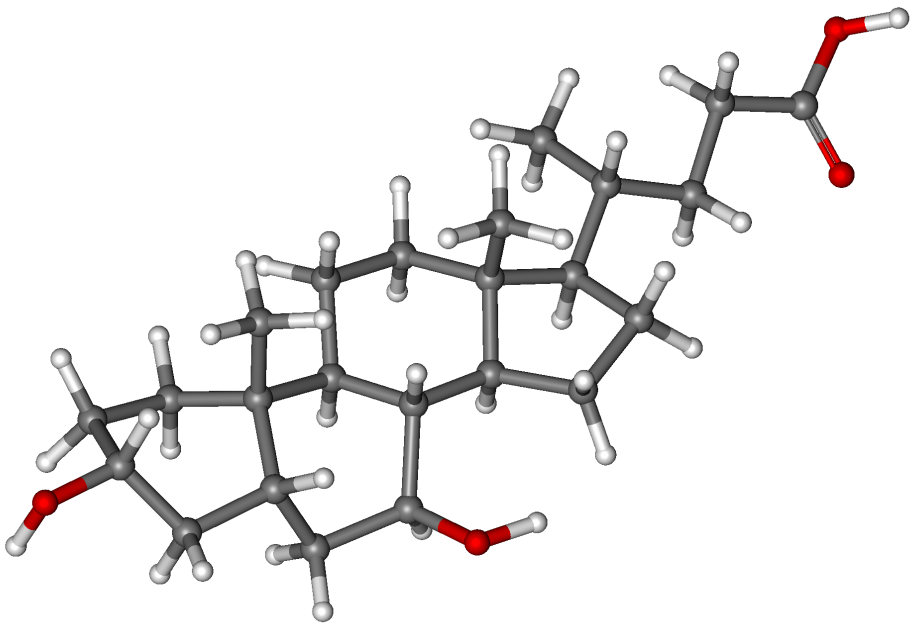


ICP Maternal Treatment



- Maternal treatment focuses on reducing both the pruritus she is experiencing and the risk of perinatal morbidity and mortality.
- There is no other serious maternal symptoms other than pruritus; however this can be severe.
- Women with normal serum bile acid and AST levels can be offered options:
  - Empiric treatment
  - Laboratory testing repeated weekly and treatment started when the TSBA or AST levels or both become elevated

ICP Maternal Treatment



The preferred medication for treatment of maternal pruritus due to ICP is Ursodeoxycholic acid (UDCA) *(Shown on the left)* [67]. No additional lab testing is needed prior to initiating UDCA other than those drawn for diagnosis of ICP.

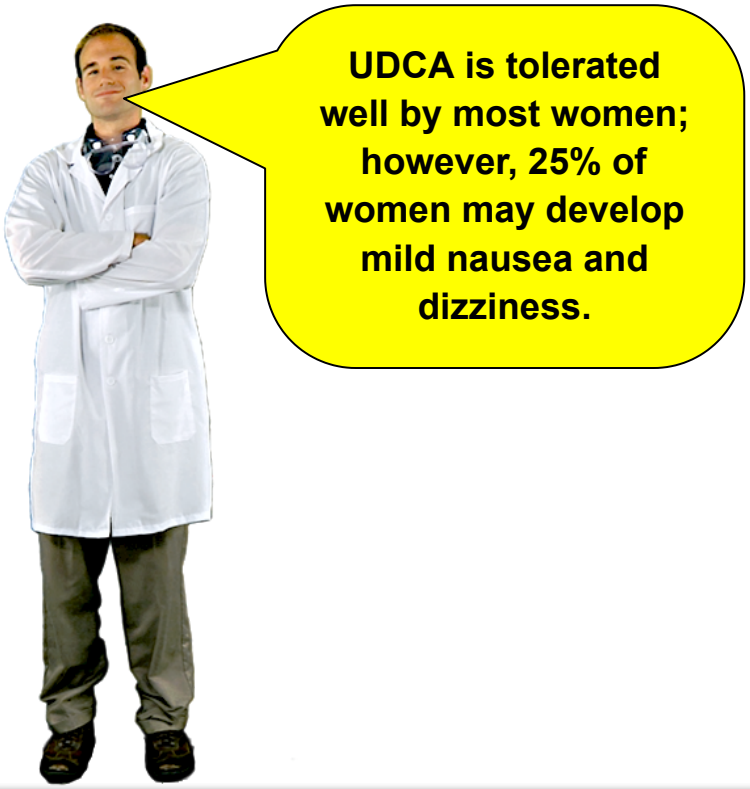
A meta-analysis in 2019 identified the efficacy of UDCA for reducing maternal symptoms and adverse perinatal outcomes [72, 73, 74].

Pruritis is generally decreased in one to two weeks after initiation of UDCA.

ICP Maternal Treatment

- There is no well-defined dose of UDCA but recommendations include taking until delivery [48]:
  - UDCA 300 mg orally three times a day or 15 mg/kg per day
  - UDCA 300 mg orally twice daily or 10 mg/kg per day
- If pruritus is not decreased in two weeks of starting UDCA, the dose is increased every one or two weeks until symptoms are relieved to a maximum dose of 21 mg/kg per day [68,69,70,71].

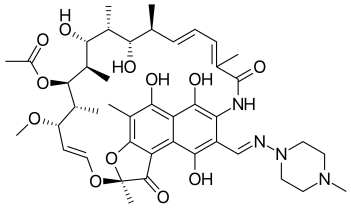
ICP Maternal Treatment



- Following the initiation of UDCA, weekly maternal TSBA concentrations are monitored because significantly increased risk of stillbirth is noted when maternal concentrations ≥ 100 µmole/L [60].
- Improvement in lab results is seen in three to four weeks.
- UDCA is discontinued when labor begins if used for management of ICP symptoms.

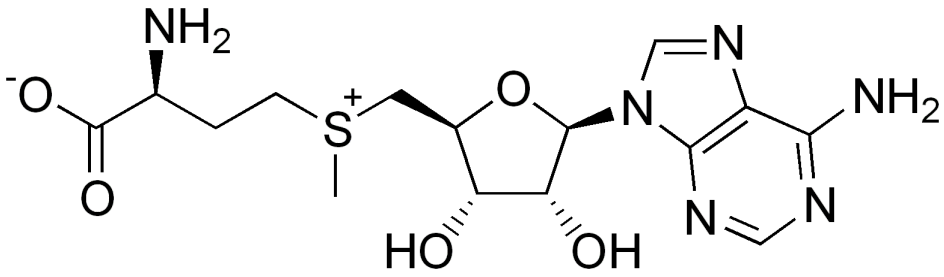
ICP Maternal Treatment

One of these drugs can be ADDED if pruritis is not relieved with UDCA:

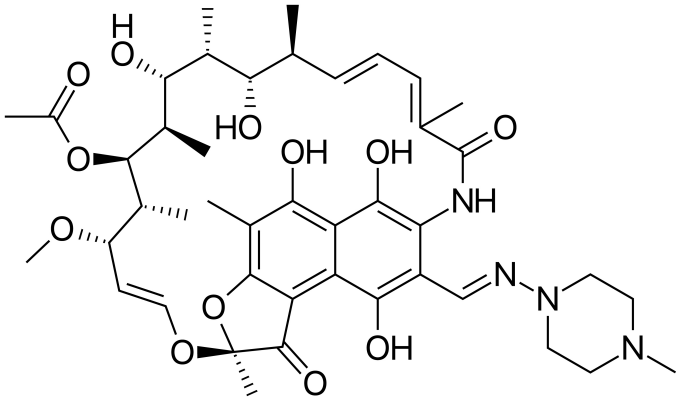


Click the chemical structure for a look at the chemical structures for each medication.

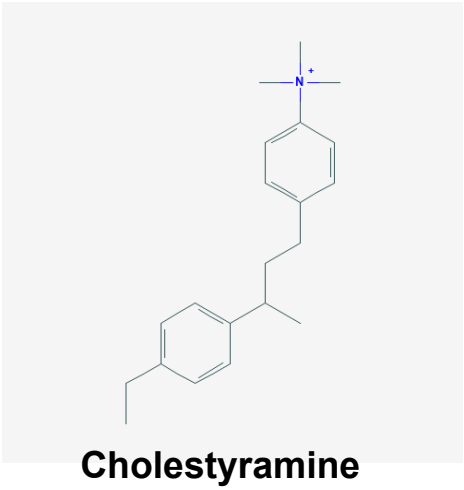
- Studies of combination use of medication for treatment of symptoms with ICP are limited to less than 30 patients [80,81].
  - S-Adenosyl-methionine (SAMe)
  - Cholestyramine
  - Rifampin (aka rifampicin)
- Alternate therapy for women who are unable to take UDCA. This therapy is generally less effective:
  - Hydroxyzine



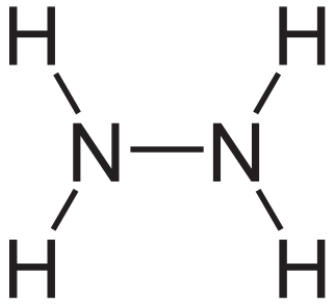
SAMe



Rifampin



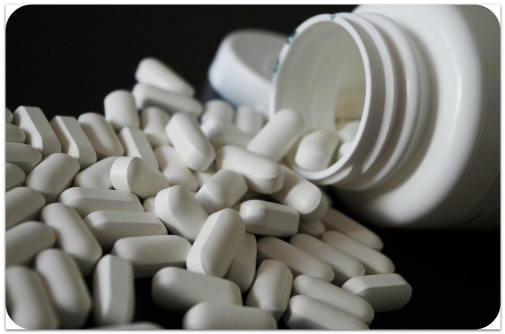
Cholestyramine



Hydrazine

National Center for Biotechnology Information. PubChem Database. Cholestyramine, CID=70695641, https://pubchem.ncbi.nlm.nih.gov/compound/Cholestyrami (accessed on Dec. 8, 2019)

ICP Maternal Treatment if UDCA Alone is Ineffective



S-adenosyl-methionine (SAMe):

- SAMe is a glutathione precursor and influences the composition and fluidity of hepatocyte plasma membranes. In addition, SAMe increases the methylation and biliary excretion of hormone metabolites [76].
- In a meta-analysis of five randomized trials of 311 pregnant women, UDCA at a dose of 450 to 1000 mg/day decreased the pruritus score, total bile acids, and alanine aminotransferase levels more effectively than SAMe 800 to 1000 mg/day [77].
- SAMe is administered intravenously (IV) which is inconvenient when used for long term therapy. SAMe 1600 mg/day orally has been used to treat cholestasis in nonpregnant patients [78].

ICP Maternal Treatment if UDCA Alone is Ineffective

Cholestyramine

- Cholestyramine decreases ileal absorption of bile salts which increases their fecal excretion.
- Cholestyramine effect of pruritus in ICP is limited.
- Side effects of medication:
  - Constipation
  - Abdominal discomfort
  - Malabsorption of fat and fat soluble vitamins especially at doses > 4 grams per day
- Administration begins with two to four grams per day in divided doses, gradually increasing to a maximum daily dose of 16 grams as needed for symptom relief [79].

ICP Maternal Treatment if UDCA Alone is Ineffective

Rifampin (also know as rifampicin)

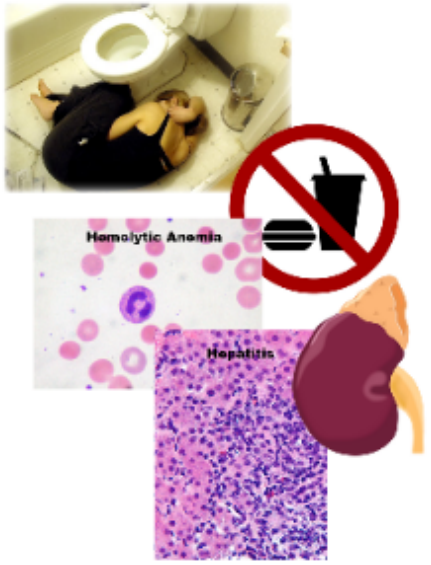
- Strong agonist of the pregnane X receptor (PXR), which mediates many detoxification and hepatobiliary processes.
- This relieves pruritus in nonpregnant patients when pruritis is associated with cholestasis.

1 of 3 >

ICP Maternal Treatment if UDCA Alone is Ineffective

Medication side effects include:

- Nausea
- Decreased appetite
- Hemolytic anemia
- Renal failure
- Hepatitis



2 of 3 >

ICP Maternal Treatment if UDCA Alone is Ineffective

In the previously mentioned study of fewer than 30 patients, a total daily dose range from 300 to 1200 mg orally administered in divided doses were identified as having improvement in pruritus. Infants of these patients were delivered between about 32 and 37 weeks gestation with good perinatal outcomes.

3 of 3

To move on with the lesson, use the arrows below.

ICP Maternal Treatment if UDCA Alone is Ineffective

There are not trials on women with ICP who use these medications. These treatment options did not improve laboratory abnormalities.

Hydroxyzine

The dose is 25 mg orally every six to eight hours to treat pruritus with minimal efficacy, but causes sedation for sleep.

ICP Maternal Treatment if UDCA Alone is Ineffective

There are not trials on women with ICP who use these medications. These treatment options did not improve laboratory abnormalities.

Chlorpheniramine

Oral administration at 4 mg every four to six hours to treat pruritus with minimal efficacy, but causes sedation for sleep.

ICP Maternal Treatment if UDCA Alone is Ineffective

There are not trials on women with ICP who use these medications. These treatment options did not improve laboratory abnormalities.

Calamine lotion or aqueous cream with 2 percent menthol may be used for pruritus.

ICP Maternal Treatment if UDCA Alone is Ineffective

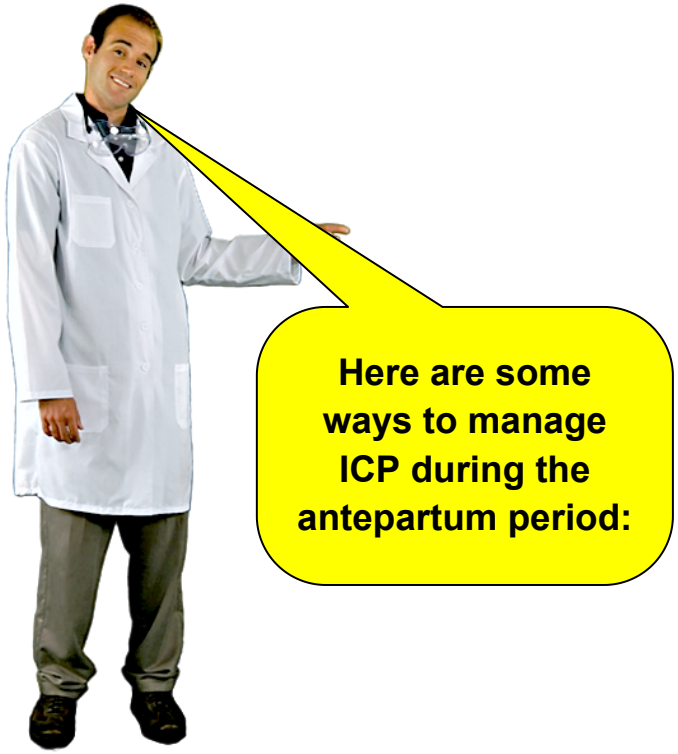
There are not trials on women with ICP who use these medications. These treatment options did not improve laboratory abnormalities.

Dexamethasone 12 mg per day did not relieve pruritus or improve serum aminotransferase levels in 130 women of a randomized trial, and was less effective than UDCA 1000 mg/day at reducing bile acids and bilirubin [82].

Phenobarbital, charcoal, ultraviolet light, and herbal remedies have been used with uncertain efficacy.

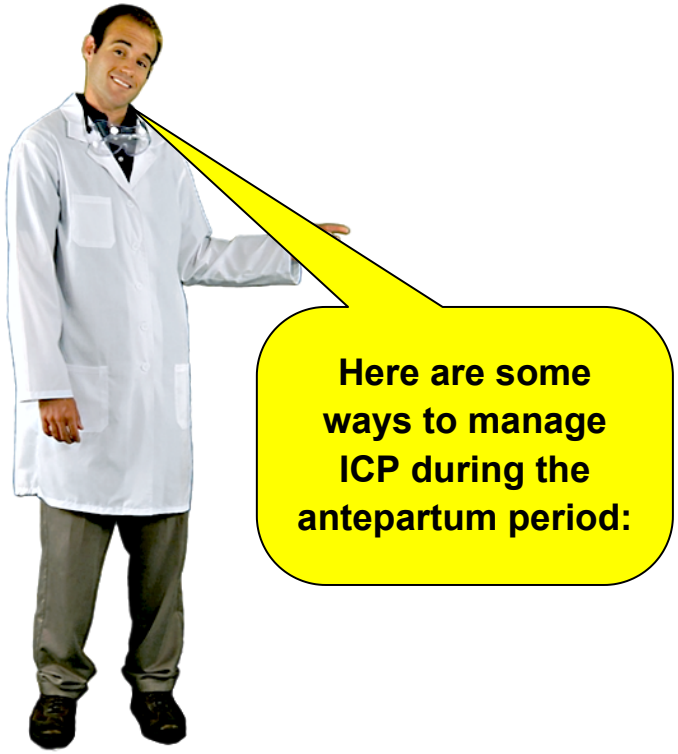
To move on with the lesson, use the arrows below.

ICP Pregnancy Management - Antepartum



Fetal testing to identify fetus at risk for demise when ICP is diagnosed is unproven. Fetal demise in women with ICP is thought to be a sudden event rather than a chronic placental vascular process so fetal nonstress tests (NSTs), biophysical profile score, and daily fetal kick counts may not identify those fetus's at risk for demise [1, 87, 89]. However, because of lack of evidence the value of fetal testing, or mechanism of fetal demise, antepartum is performed.

ICP Pregnancy Management - Antepartum



Twice weekly modified biophysical profile (BPP) is standard of care in all pregnancies with ICP.

Fetal NSTs in patients with ICP did not identify an increase in abnormal findings in those who went on to have a fetal demise in one study [83].

Other studies reported intrauterine fetal demise occurred within a few days of a reactive NST [84-90].

To move on with the lesson, use the arrows below.

ICP Pregnancy Management - Time of Delivery

A retrospective cohort study determined the risk of perinatal mortality, stillbirth and infant death, with delivery versus expectant management by gestation age week 34 and 40 weeks of gestation [91].

Gestation Period	Delivery	Expectant Management
37 Weeks	12.3	21.7
38 Weeks	13.7	23.1
39 Weeks	18.3	33.6

A California study between 2005 and 2008 were analyzed in women with ICP. Fetal, neonatal, and infant mortality was lowest when delivered at 36 weeks gestation and lower than mortality with expectant management at 36 weeks. This observation of lower mortality with delivery versus expectant management occurred when at 37 weeks of gestation (12.3 versus 21.7 per 10,000 fetuses at risk, 38 weeks gestation (13.7 versus 23.1 per 10,000 fetuses at risk, 39 weeks 18.3 versus 33.6 per 10,000 fetuses at risk. This study had limitations; no information on maternal bile acid or transaminase levels, gestation age at the onset of the disease, treatment, and the number of deaths.

ICP Pregnancy Management

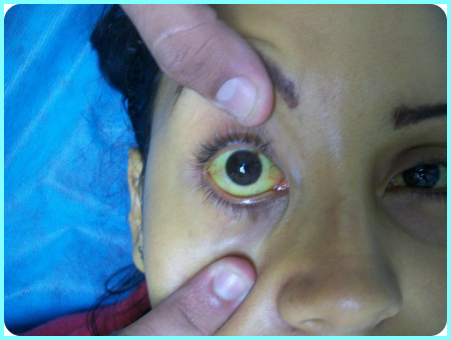
Most women with ICP are delivered at 36+0 to 36+6 weeks gestation or upon diagnoses with ICP if greater than 37+0 weeks of gestation. The decision to deliver is to reduce the risk of fetal demise and so disease resolution can begin for the woman.

ICP Pregnancy Management

Delivery should be considered prior to 36 weeks gestation in women with ICP and:

- Jaundice
- Total serum bile acid concentration ≥ 100 µmole/L [60, 92, 93].

The bile acid concentration can take several days for results even in major laboratories which makes it a impractical tool to identify immediate risk [94].



Use the arrows below to move forward with the lesson.

ICP Pregnancy Management

Counseling prior to an early delivery:

- All women who electively deliver prior to 36 weeks should be counseled about absence of definitive evidence that the maternal and fetal benefits of delivery outweigh the potential morbidity of prematurity.
- All women are educated on the limits of fetal lung maturity testing to predict neonatal status.
- If the woman consents to an early delivery after receiving this counseling, a course of antenatal corticosteroids are given prior to delivery.

ICP Guidelines from Professional Organizations

The American College of Obstetricians and Gynecologists
Recommends delivery at 36+0 to 37+0 weeks of gestation or at diagnosis if diagnosed at term [100].

The Royal College of Obstetricians and Gynecologists
Justifies offering women induction of labor after 37+0 week of gestation, especially those with severe laboratory abnormalities [95].

ICP Guidelines from Professional Organizations

The Society for Maternal-Fetal Medicine

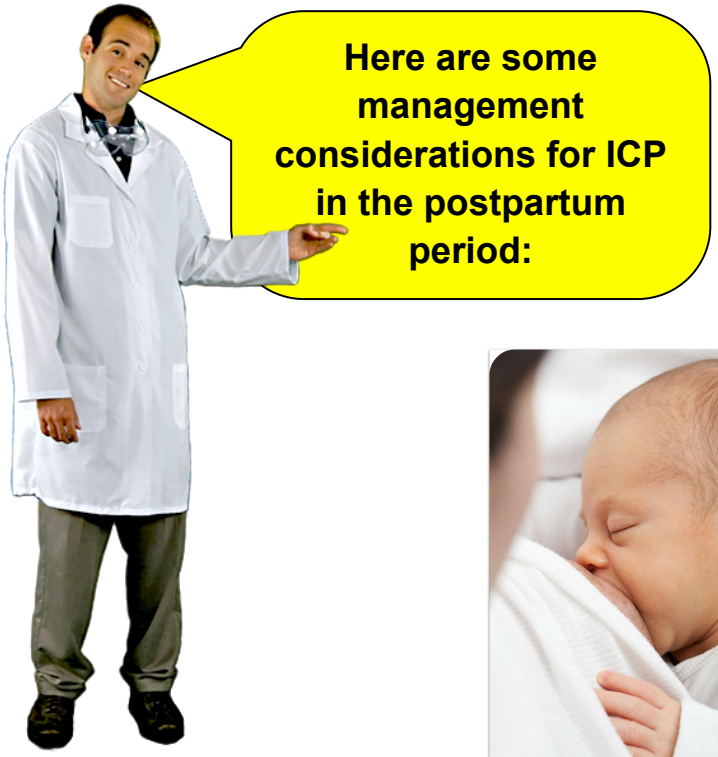
States that evidence based recommendation is not available for the timing of delivery when ICP is present. Most management strategies advocate for delivery between 37 and 38 weeks gestation and sooner with documented pulmonary maturity and prior obstetrical history, antenatal testing, and gestational age are to be considered [96]. This opinion is based on three studies comparing pregnancy with and those not complicated by ICP [57,97,98]. The Society for Maternal-Fetal Medicine did not consider bile acid level to guide their recommendation but cited a study supporting expectant management of mild ICP with a bile acid < 40 μmol/L.

To move on with the lesson, use the arrows below.

ICP Delivery Recommendations

- No specific or special recommendations are considered related to delivery in a woman with ICP.
- During labor, continuous fetal monitoring is indicated related to increased occurrence of fetal death and non-fatal asphyxia events [99, 101].
- Vitamin K is not routinely evaluated prior to delivery; however the prothrombin time (PT) can be checked and vitamin K administered if prolonged [102, 103].
- Increased cesarean delivery rates are not noted with induction of labor compared with expectant management.
- A meta-analysis including non-randomized studies found no difference in cesarean section rates associated with use of UDCA [110].

ICP Postpartum Maternal Management

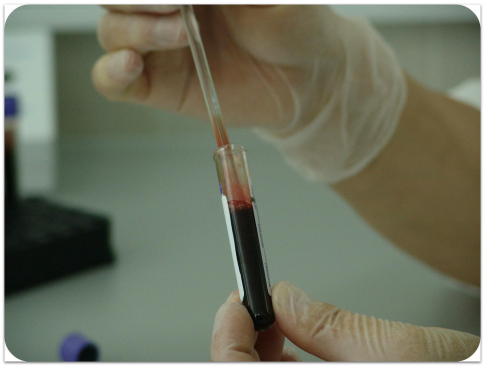


- Pruritus generally resolves in a few days following delivery.
- Serum bile acid concentrations and liver function tests are normalized in the first few days following delivery.
- Women with ICP can breastfeed without complications. UDCA is noted in low levels in breast milk; therefore, small amounts will be ingested by the infant but not expected to cause adverse effects in the infant [104].

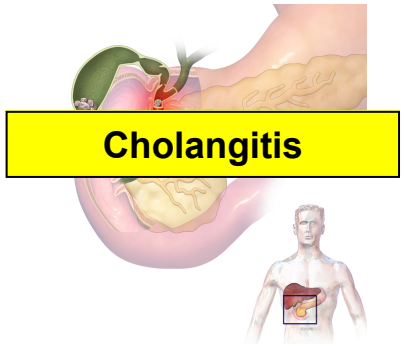
ICP Postpartum Monitoring

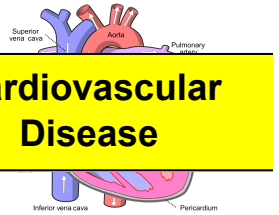
Six to eight weeks following delivery, total bile acid concentration and transaminases are rechecked.

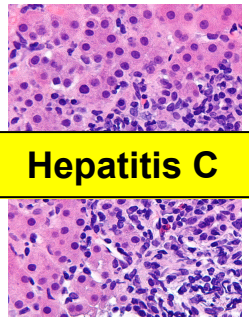
If either blood test does not return to normal, referral to a hepatologist is recommended to evaluate for hepatobiliary diseases.

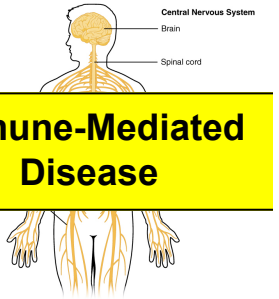


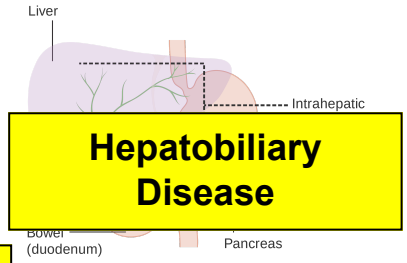
Studies suggest ICP may be associated with [34, 35, 105, 106]:
Click the pictures for the associations.

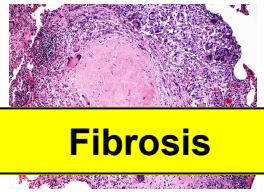








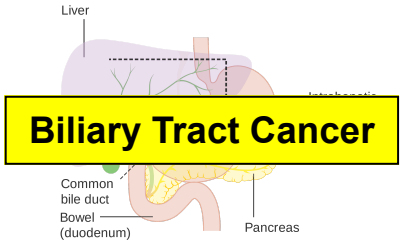




ICP Postpartum Monitoring

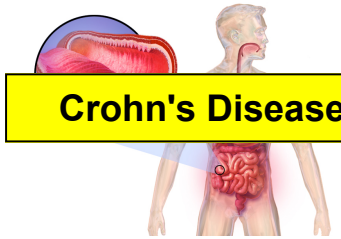
A Swedish registry-based study of 11,000 postpartum women who developed ICP in her pregnancy with over 113,000 women who delivered without ICP, ICP was associated with [106]:

Click the pictures for the associations

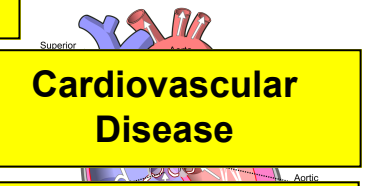


Biliary Tract Cancer

Diabetes

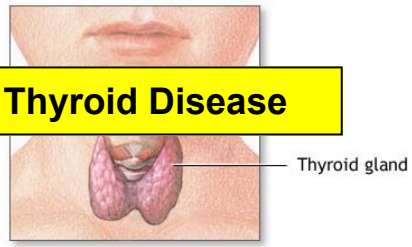


Crohn's Disease



Cardiovascular Disease

Cardiovascular disease was only in women with ICP who had preeclampsia

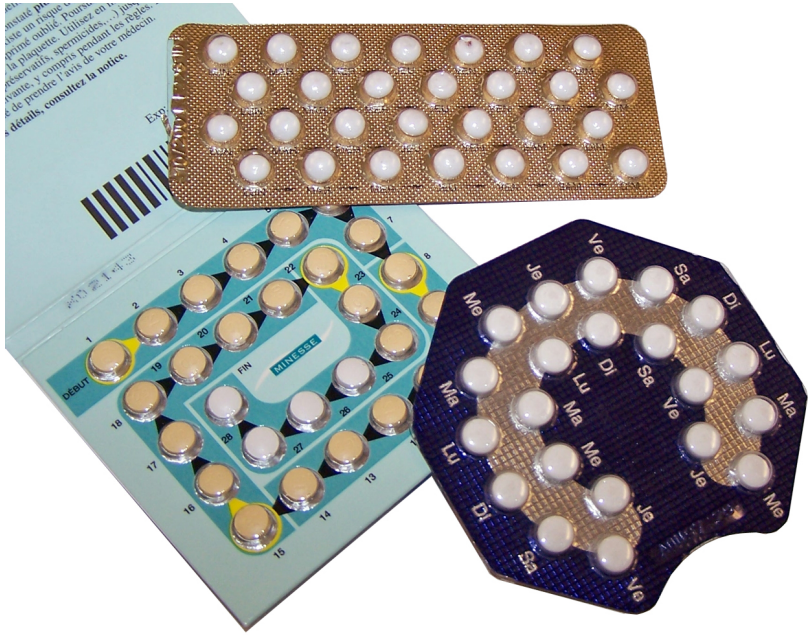


Thyroid Disease

ICP Postpartum Contraception

- Nonhormonal contraception may be used without complications.
- If a woman had a history of cholestasis related to use of estrogen-progestin contraception then non-estrogen contraception is preferred for her.
- Combination contraception, estrogen-progestin methods, rarely is associated with recurrent cholestasis.
- Centers for Disease Control and Prevention (CDC) considers estrogen-progestin contraception an acceptable choice for women with a history of ICP since the benefits outweigh the risks [107].
- Estrogen-progestin contraception may be initiated after liver function tests (LFT) are evaluated and normal.
  - LFT should be rechecked three to six months after imitation of estrogen-progestin contraception.
- A woman who has had ICP and uses estrogen-progestin contraception should be educated to promptly discontinue use if she develops pruritus or cholestasis.

ICP Postpartum Contraception



- Progestin-only contraception is an acceptable choice for women with history of ICP or cholestasis related to estrogen-progestin contraception per CDC [107].
- Progestin-only contraception is not associated with recurrent cholestasis.

ICP Planning and Prevention

ICP recurs in approximately 60 to 70% of women.

Severity of disease is variable in subsequent pregnancies compared to the first occurrence.

ICP Summary and Recommendations

- ICP is characterized with pruritus and elevated serum bile acid levels.
  - Pruritus is generalized but predominates on the palms of the hands and soles of the feet and is worse at night.
- ICP generally develops in the second and/or third trimester.
- ICP rapidly resolves following delivery.
- Diagnosis is based upon pruritus associated with elevated serum bile acid levels, elevated aminotransferases, both, and the absence of diseases that cause similar symptoms and laboratory abnormalities.
  - Twenty percent of cases of ICP are severe with a serum bile acids are > 40 µmole/L
- Pruritus can occur several weeks prior to lab abnormalities being noted.
- If UDCA is started, elevated bile acid and transaminase level may not be noted.

ICP Summary and Recommendations

- The differential diagnosis of symptoms must be considered.
  - Elevated transaminase levels are noted in HELLP syndrome, preeclampsia with severe features, and acute fatty liver of pregnancy.
  - The lack of primary skin lesions in ICP helps to differentiate ICP from other skin conditions unrelated to pregnancy.
- The major complications of ICP include increased risk of intrauterine demise, meconium-stained amniotic fluid, preterm delivery, neonatal respiratory distress syndrome (RDS) due to association of bile acids entering the fetal lungs.
- Serum total bile acid level ≥ 100 µmole/L is associated with higher risk for stillbirth.
  - Bile acid levels are checked at least weekly in all women with ICP.
  - Management is based upon the highest total serum bile concentration level.

ICP Summary and Recommendations

- The goal is to decrease maternal pruritis and possibly prevent fetal complications.
- Initiate treatment if pregnancy < 37 weeks gestation.
- Treatment is with urosodeoxycholic acid; ursodiol or UDCA which are synthetic bile acids.
- UDCA reduces or relieves pruritis, has no known fetal toxicity, and is well tolerated by women. The optimal dose has not been determined; however, 300 mg orally two to three time daily is reasonable. Discontinue medication when she delivers.
- Delivery if pregnancy ≥ 37 weeks gestation.

ICP Summary and Recommendations

- The goal is to deliver women with ICP at 36 weeks gestation; unless diagnosed after 36 weeks gestation then deliver immediately. Delivery may occur earlier then 36 weeks gestation in complicated cases.
- Serum bile acids and liver function levels are checked six to eight weeks following delivery.
  - If recheck blood testing is not normal, referral to a hepatobiliary specialist is recommended.
- ICP recurs 60-70% of the time in subsequent pregnancies.
- Breastfeeding is considered safe when a pregnancy has been complicated with ICP.

ICP CARE

fight the itch. save a life.

To learn more about ICP, please review at https://icpcare.org/
Like the Facebook page https://www.facebook.com/ICPcare

Congratulations!

You have successfully completed this module.

Click on the above 'X' to take the post-test for this course.
If you do not attain a passing score after two attempts at the post-test the entire program must be repurchased.

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