R F S
REVISTA FACULTAD DE SALUD
www.rfsrevista.edu.co

R.F.S Revista Facultad de Salud
Enero-Junio de 2014;6(1): 9-13

Acute renal injury in expectant mothers in the intensive care unit of Hospital Universitario, Neiva, 2010-2012

Injuria renal aguda en gestantes de la Unidad de Cuidado Intensivo del Hospital Universitario de Neiva, periodo 2010-2012

Julián Andrés Valverde Cortes[1], Sandra Ximena Olaya Garay[2], Sandra Milena Rojas[3], Claudia Marcela Hernández[4]

Summary

The treatment of obstetric patients aims to decrease morbidity and mortality and have positive results at the end of pregnancy whilst reducing the risk of complications, the development of chronic illnesses or possible after-effects for the mother and baby. This demonstrates the importance of detecting acute renal injury in critically ill obstetric patients being cared for in the gynaecological-obstetric intensive care unit in Hospital Universitario, Neiva.

A descriptive and retrospective study based on case studies was conducted. It was found that 47.8% of patients were first-time mothers and 11.7% presented acute renal injury, with an average age of 25.3 years 95% CI. 52.5% had previously been diagnosed as being at high obstetric risk. The average gestational age was 35.6 weeks 95% CI. 34% suffered from severe pre-eclampsia, 48.7% were classified as AKIN 1, oliguria was present in 23.9%, 13% required haemodialysis whilst 4.3% of cases ended in death.

This demonstrates the importance of continuous monitoring of young first-time mothers at high obstetric risk who are in the third trimester of pregnancy or immediately after the birth and are hospitalised in intensive care units with abnormal levels of creatinine and urine and diagnosed with severe pre-eclampsia.

Key words: acute renal injury, pregnancy, intensive care unit.

Resumen

Los esfuerzos en el tratamiento de pacientes obstétricas, están dirigidos a la disminución de la morbi-mortalidad, con resultados favorables al término de la gestación, disminuyendo el riesgo de complicaciones, desarrollo de enfermedades crónicas o posibles secuelas para la madre y el producto; esta es la importancia de determinar la presentación de injuria renal aguda en pacientes obstétricas gravemente enfermas atendidas en la unidad cuidado intensivo gineco-obstétrico del Hospital Universitario de Neiva.

Se desarrolló un estudio descriptivo, retrospectivo, tipo de serie de casos, se encontró que el 47,8%, eran primigestantes, y el 11,7% presentaron injuria renal aguda, con una edad promedio de 25,3 años IC 95%, con diagnóstico previo de alto riesgo obstétrico (ARO) en el 52,2%.

La edad gestacional promedio fue de 35,6 semanas IC 95%, predominando la preeclampsia severa en el 34%, clasificadas como AKIN 1 en el 48,7%, oliguricas en el 23,9%, el 13% del requirió hemodiálisis y la muerte fue el desenlace en el 4,3%.

Se establece de esta forma, la importancia de seguimientos continuos a las primigestantes jóvenes, alto riesgo obstétrico, en el tercer trimestre del embarazo o en puerperio inmediato, hospitalizadas en unidad de cuidados intensivos con alteración del valor de creatinina, los volúmenes urinarios y diagnóstico de preeclampsia severa.

1 Internist, Universidad Surcolombiana, Neiva, Colombia
2 Gynaecologist, specialist in critical care, assistant professor of gynecological-obstetrics Universidad Surcolombiana, ICU Obstetrics Coordinator, Hospital Universitario Hernando Moncaleano Perdomo; Neiva, Colombia.
3 Epidemiologist, Faculty of Health, Universidad Surcolombiana, Neiva, Colombia.
4 SInternist, Specialisation in renal medicine, Hospital Universitario Hernando Moncaleano Perdomo; Neiva, Colombia.
Datos de contacto: Julián Valverde Cortés. Correo electrónico: julianvalverdec@hotmail.com
Received: 03/04/2013 - Revised: 19/05/2013 - Accepted: 28/06/2014

Palabras clave: Injuria renal aguda, embarazo, unidad de cuidado intensivo.

Introduction

Gestation is a physiological state that can be affected by a large number of conditions, commonly including renal conditions[1]. Acute renal injury is a potentially life-threatening complication during pregnancy[2]. In the last 40 years, cases have declined dramatically in developed countries from 0.5 cases per 1000 pregnancies to 1 for every 20,000 pregnancies[3]. However, pregnancy is a risk factor in 15 to 20% of cases of ARI (acute renal injury) in developing countries[4], and the incidence rate varies widely, between 4% and 36% depending on the study[5].

Acute renal injury is often evident in conditions like severe pre-eclampsia[6, 7], HELLP syndrome [8] and acute fatty liver during pregnancy, in addition to numerous obstetric complications such as antepartum and postpartum haemorrhage[9] as well as associated infectious processes[10-12], which can range from a subclinical state to need for permanent dialysis[13].

Acute renal failure is defined as an increase of 0.3mg/dl of creatinine or an increase of 1.5 times with respect to the base level, or a decreased urine output below 0.5 cc/kg/hr for six hours[8]. In a pregnant women these abnormalities increase morbidity and the risk of mortality, causing problems in treatment and making the prognosis more difficult to determine, given the importance of determining the characteristics of this sample, its treatment and its prognosis[13].

In this country there are few publications related to abnormalities during pregnancy or physiological changes to the mother's body that, one way or another, contribute to certain complications in the mother [14].

In our region, the centre of attention for seriously ill obstetric patients is the city's gynaecological-obstetric intensive care unit in Neiva's Hospital Universitario. This centre inspired this study as there are no similar studies here, and few similar studies at a national level, which consider the changes observed in pregnant women with acute renal injuries in the intensive care unit.

Materials and methods

The study is an observational, descriptive and retrospective study based on case studies from female patients with obstetric and medical diagnoses, hospitalised in the gynaecological-obstetric intensive care unit in Hospital Universitario in Neiva. The sample used in the study is of 46 patients who were all diagnosed with acute renal injury linked to pregnancy, between 1 February 2010 and 31 May 2012.

Medical records were reviewed over a one-month period, looking at variables of age, birthplace, pathological medical history, gynaecological-obstetric medical history, gestational age, APACHE upon entering the hospital, principal diagnoses, level of creatinine, degree of kidney failure, presence of oliguria, abnormalities in other systems, need for transfusion, need for dialysis and the end result.

The data was organised using EXCEL 2010 and imported into SPSS 18 for analysis: measures of central tendency and dispersion were calculated for numerical variables and percentages were calculated for qualitative, nominal variables.

The study was conducted with the prior authorisation of the ethics committees of both Hospital Universitario, Neiva and Universidad Surcolombiana. According to the Ministry of Health's 1993 Regulation 8430, article 11, which establishes scientific, technical and administrative standards for health research, this study is classified as a no-risk investigation due to the fact that the technique and the method is based on documents, reviewing medical records and a survey without identifying, nor dealing with sensitive aspects of the patients' conduct.

Results

Between 1 February 2010 and 31 May 2012, 1,061 women were treated in the gynaecological-obstetric intensive care unit of Neiva's Hospital Universitario. 392 of these patients were obstetric patients, corresponding to 36.94%. Of these patients, 46 showed acute renal injury, 2.3% of the sample and 11.7% of the pregnant patients. It was also determined that for every 8.5 obstetric patients cared for in the intensive care unit without renal injury, there was one case of acute renal injury.

The average age of the patients was 25.33 years old 95% CI (22.76, 27.89) (Figure 1) mainly coming from the urban area of the city of Neiva, Huila (41.3%). 50% were unmarried but in a relationship and 41.3% of socioeconomic stratum 1.

The most common pre-existing conditions were urinary tract infections, affecting 6.5%. 80.4% did not show any pre-existing conditions, however a diagnosis of high obstetric risk was found in 52.2% (Table 1), with adolescent first-time mothers and poor pre-natal care prevailing in 10%.

It was determined from the gynaecological history that the majority of the sample had had only one pregnancy (47.8%), without history of labour in 78.3%, without history of abortion in 87% and without children at the time of the study in 43% of the sample.

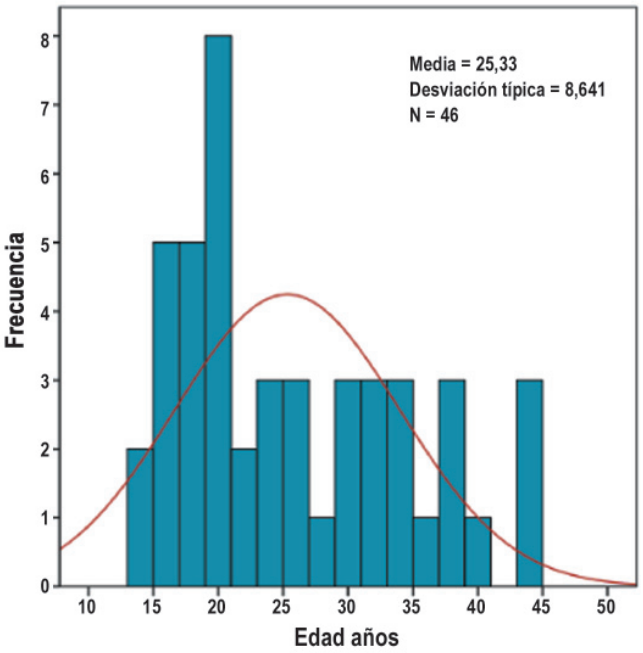

Figure 1. Age distribution in years of the obstetric patients with acute renal injury, gynaecological-obstetric intensive care unit, Hospital Universitario, Hernando Moncaleano Perdomo.

The average gestational age was 35.6 weeks 95% CI (34, 42-36, 76), (Figure 2). 73.9% underwent a caesarean, 6.5% required a hysterectomy and 4.3% required a partial bilateral salpingectomy.

The principal diagnosis found was severe preeclampsia among 56.52% of cases, followed by HELLP syndrome in 17.39% (Figure 3).

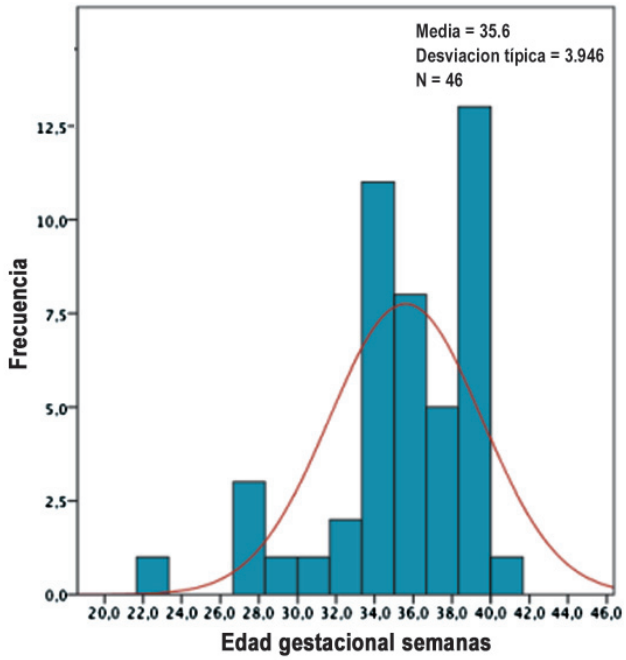

Figure 2. Gestational age of obstetric patients with acute renal injury, gynaecological-obstetric intensive care unit, Hospital Universitario, Neiva.

Table 1. Frequency according to history of high obstetric risk, patients with acute renal injury, gynaecological-obstetric intensive care unit, Hospital Universitario, Neiva.

High obstetric risk	Frequency	Percentage (%)
NO	22	47.8
YES	24	52.2
Total	46	100%

According to the APACHE II scale, upon entering the unit, the most common value was of 2 in 21.7%, without damage to other systems in 39.1%, followed by haematological disorders in 15.2%. 4.3% of cases ended in death.

The average level of creatinine was 1.56 mg/dl 95% CI (1.12 – 2.00). 23.9% displayed oliguria, (Table 2) 21.7% required furosemide and 13% required haemodialysis (Table 3).

The most common abnormality was anaemia (80.4%), followed by thrombocytopenia with a platelet count below 50,000 in 76.1%. 41.3% of these patients needed a transfusion of blood products.

Table 2. Distribution according to the presence of oliguria in obstetric patients with acute renal injury in the gynaecological-obstetric intensive care unit, Hospital Universitario, Hernando Moncaleano Perdomo.

Oliguria	Frequency	Percentage (%)
NO	35	76.1
YES	11	23.9
Total	46	100%

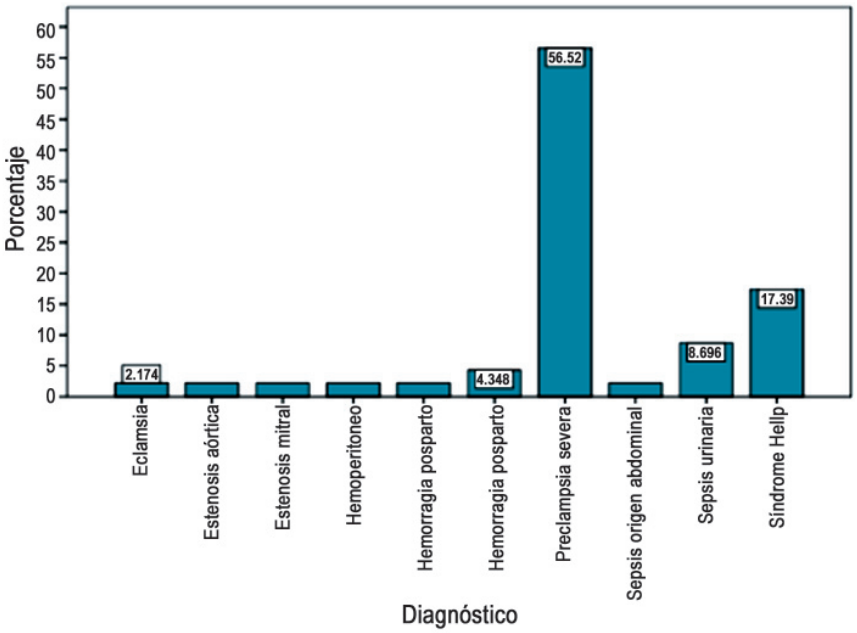

Figure 3. Distribution according to the most common diagnoses of obstetric patients with acute renal injury upon entering the gynaecological-obstetric intensive care unit, Hospital Universitario, Neiva, Huila.

Table 3. Distribution according to the need for haemodialysis in obstetric patients with acute renal injury in the gynaecological-obstetric intensive care unit, Hospital Universitario, Hernando Moncaleano Perdomo.

Haemodialysis	Frequency	Percentage (%)
NO	40	87.0
YES	6	13.0
Total	46	100%

The study established that the majority of patients (47.8%) were classified as AKIN 1 (Table 4), but the patients who were given haemodialysis were classified as AKIN 3. Those who died were reported as AKIN 2 and 3.

In the cases of death, the most common diagnosis was severe preeclampsia associated with systemic lupus erythematosus in 50% and severe preeclampsia associated with postpartum haemorrhage and haemorrhagic stroke in the remaining 50% (Table 5).

Table 4. Distribution according to AKIN classification in obstetric patients with acute renal injury in the gynaecological-obstetric intensive care unit, Hospital Universitario, Hernando Moncaleano Perdomo.

Akin	Frequency	Percentage (%)
1	22	47.8
2	14	30.4
3	10	21.7
Total	46	100%

Table 5. Death rate in obstetric patients with acute renal injury in Hospital Universitario Hernando Moncaleano Perdomo.

Death	Frequency	Percentage (%)
NO	44	95.6
YES	2	4.4
Total	46	100%

Discussion

The study revealed the presence of acute renal injury in pregnant patients cared for in the gynaecological-obstetric intensive care unit in Neiva, mainly in young patients around 20 years old. These results are similar to what has been reported in various studies worldwide, in countries where this problem is more common [12-15].

Severe preeclampsia and HELLP syndrome in the third trimester of gestation continue to be the most common diagnoses in the majority of western countries [15, 16], just like the percentage of patients who require kidney dialysis[17]. However, it is worth noting the differences in countries like India and Pakistan where acute renal injury is most common in the first trimester of pregnancy associated with severe sepsis [18, 19].

AKIN 1 was generally the most common classification, however, in this study, some patients who died were classified as AKIN 2 or 3 [20].

Possible risk factors that increased the chance of complications or mortality of these patients were not established. Globally, it has only been possible to establish an increased prevalence of hypertension and prior kidney damage [18].

Conclusions

Continuous monitoring of young first-time mothers is essential, especially if they have been classified at high obstetric risk with a history of urinary tract infections or preeclampsia.

Creatinine and urine levels should be strictly monitored in all obstetric patients hospitalised in the intensive care unit, along with permanent care, especially if they have severe preeclampsia or HELLP syndrome.

It is important to establish surveillance programmes in order to prevent complications, increase safety and reduce mortality among obstetric patients with acute renal injury, applicable at all levels of healthcare.

The study established frequencies, percentages and, in some cases, crosses of variables without being able to determine genuine measures of association, since it is a descriptive study. It is important to specify that, due to the lack of similar studies in the region and indeed the country, the study was based on case studies in order to propose, for the first time, variables of interest in this population, proposing possible connections, effects or risk factors which provide a basis to create proposals or hypotheses to be studied in subsequent research or investigations.

Bibliography

1. Taal, M.W., B.M. Brenner, and F.C. Rector, *Brenner & Rector's the kidney*. 9th ed. ed. 2012, Philadelphia, PA: Elsevier/Saunders.
2. Gammill, H.S. and A. Jeyabalan, *Acute renal failure in pregnancy*. Crit Care Med, 2005. 33(10 Suppl): p. S372-84.
3. Randeree, I.G., et al., *Acute renal failure in pregnancy in South Africa*. Ren Fail, 1995. 17(2):147-53.
4. *ACOG (American College of Obstetrics and Gynecology) Practice Bulletin: nausea and vomiting of pregnancy*. Obstet Gynecol, 2004. 103(4):803-14.
5. Naqvi, R., et al., *Acute renal failure of obstetrical origin during 1994 at one center*. Ren Fail, 1996. 18(4):681-3.
6. *ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologists number 34, February 2002. Management of infertility caused by ovulatory dysfunction. American College of Obstetricians and Gynecologists*. Obstet Gynecol, 2002. 99(2):347-58.
7. Hallak, M., *Effect of parenteral magnesium sulfate administration on excitatory amino acid receptors in the rat brain*. Magnes Res, 1998. 11(2):117-31.
8. Sibai, B.M., et al., *Maternal morbidity and mortality in 442 pregnancies with hemolysis, elevated liver enzymes, and low platelets (HELLP syndrome)*. Am J Obstet Gynecol, 1993. 169(4):1000-6.

9. *Management of the third stage of labour to prevent postpartum hemorrhage*. J Obstet Gynaecol Can, 2003. 25(11):952-5.
10. Sriskandan, S., *Severe peripartum sepsis*. J R Coll Physicians Edinb, 2011. 41(4):339-46.
11. Odegard, R.A., et al., *Preeclampsia and fetal growth*. Obstet Gynecol, 2000. 96(6):950-5.
12. Bentata, Y., et al., *Acute kidney injury related to pregnancy in developing countries: etiology and risk factors in an intensive care unit*. J Nephrol, 2012. 25(5): 764-75.
13. *Report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy*. Am J Obstet Gynecol, 2000. 183(1):S1-S22.
14. Hassan, I., A.M. Junejo, and M.L. Dawani, *Etiology and outcome of acute renal failure in pregnancy*. J Coll Physicians Surg Pak, 2009. 19(11):714-7.
15. Ansari, M.R., M.S. Laghari, and K.B. Solangi, *Acute renal failure in pregnancy: one year observational study at Liaquat University Hospital, Hyderabad*. J Pak Med Assoc, 2008. 58(2):61-4.
16. Sánchez Valdivia, A.J., et al., *Fallo renal agudo en la paciente obstétrica gravemente enferma*. Revista Cubana de Obstetricia y Ginecología, 2011. 37:457-470.
17. Drakeley, A.J., et al., *Acute renal failure complicating severe preeclampsia requiring admission to an obstetric intensive care unit*. Am J Obstet Gynecol, 2002. 186(2): 253-6.
18. Gurrieri, C., et al., *Kidney injury during pregnancy: associated comorbid conditions and outcomes*. Arch Gynecol Obstet, 2012. 286(3):567-73.
19. Montejo Hernandez, J.D. and A.N. Jaramillo Cataño, *Falla renal aguda en pacientes embarazadas. Caso clínico y revisión de la literatura. Caso clínico y revisión de la literatura*. Medicina UPB, 2005:171-181.
20. Prakash, J., et al., *Acute kidney injury in late pregnancy in developing countries*. Ren Fail, 2010. 32(3):309-13.