

Neonatal sepsis, experience in a maternal-pediatric hospital

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Abstract

The neonatal sepsis is one of the principal diagnostics in an intensive neonatal care unit. In Mexico, the new born, may die in the first week of life by respiratory distress and premature, congenital pneumonia, sepsis, after the first week of life neonatal sepsis be more frequently. The neonatal sepsis, have an affection of 1 to 5 cases by 1000 new born alive, in the intensive neonatal care units can be at 15 to 35 cases by 1000 new born alive, with a lethality between 20 to 60%, the most common microorganism is Klebsiella pneumoniae, Escherichia Coli, Pseudomonas aeruginosa and Salmonella, also can presented Candida ssp. and less frequency virus. This become a challenge in health attention, for example, perhaps many microorganism con join with different sensibility for antibiotics and get antibiotics resistance and will need more antibiotics, cultives, more time of hospitalization, etc. In the hospitals is where the antibiotic resistance is more frequently. So here is where have to take action to reduce this kind of infections in a 80%. The objective of this presentation is too show de experience. In the maternal - pediatric hospital of Atizapan Guadalupe Victoria to decreased neonatal sepsis, we will present the actions that make as health team to attack this problem.

Introduction: In 2017, in the world, about 2.5 millions of children die during the first month of life, the most of the deaths occurred between the first week of life, approximately 1 million of new borns die in the first 24 hours, the main causes of mortality are prematurity, asphyxia, neonatal infections and congenital malformations. the neonatal world mortality a 99% are in de velopment countrys and estimates be in 35% as the cause of all the deaths. The neonatal sepsis, have an affection of 1 to 5 cases by 1000 new born alive, in the intensive neonatal care units can be at 15 to 35 cases by 1000 new born alive, with a lethality between 20 to 60%, the most common microorganism is Klebsiella pneumoniae, Escherichia Coli, Pseudomonas aeruginosa and Salmonella, also can presented Candida ssp. and less frequency virus. In Mexico during the first week the bacterial sepsis and congenital pneumonia joint, after the first week is more common this kind of infections. The 75% of the deaths been in the first week, and between 25% and 45% in the first 24 hours. This give us a neonatal mortality rate in 8 per 1000 new born alive in Mexico. Also the mortality can change between hospitals 13% to 44 %, this depends that is the hospital are in urban towns or in rural towns.

The principal's pathogens in neonatal sepsis are; Klebsiella pneumoniae, Escherichia coliy Pseudomonas aeruginosa, Staphylococcus aureus and Candida albicans.

The factors that help to increase neonatal sepsis in the neonatal intensive care unit are prematurity because increase the days in the unit, have an immature immunity system, need central catheters, parenteral nutrition, and a colonization by genital tract also by hospital infection, the presence of other patients in the same conditions. The importance to reduce the incidence of neonatal sepsis is not only for reduce the risk of dead, neurologic sequels, increase hospitalization days an also increase the cost of the stay. The neonatal sepsis is a disease that can be reduce the incidence until a 80%, the difficult be that is multifactorial and need the work of all the health team. There is many ways to reduce de incidence of neonatal sepsis that are probe (wash hand program, watch the catheter acceses, etc.), the difficult is to implement in a the medical system. In the maternal - pediatric hospital of Atizapan Guadalupe Victoria we have a elevation of neonatal sepsis, we will present the actions that make as health team to attack this problem.

Development: In the Maternal - Pediatric Hospital of Atizapan Guadalupe Victoria we have the same problem that others hospital, neonatal sepsis. In 2015, it saw an elevation in the patients with neonatal sepsis in the neonatal intensive care unit. In December of 2015 we found that in the hospital was born 4415 new borns, with 353 new borns who need hospitalized, of those, 132 patients had neonatal sepsis diagnosis, that year occurred 45 deceases associated to neonatal sepsis, with a incidence rate of 0.37, a mortality rate of 10.19 by 1000 new born alive. With this rates, that was over the national mortality rate, that is 8 by 1000 new born alive, it decides to make hand surface cultures to the neonatal intensive care unit (NICU) staff, that its about 31 health worker (doctors and nurses), so in January of 2016 its made 20 culture hand surface, random, to this staff, with the following results; 9 hand surface culture has Klebsiella pneumoniae, 5 culture development Pseudomonas aeruginosa, and 6 culture with Streptococcus aureus. There was necessary to development a hand wash course, focus in to NICU staff, with the course and the exams, making a random supervision of the hand wash program in the NICU staff, include in the five moments hand wash program (Figure 1).

It was observed a good attachment by the most of the personal by a 80% of the personal, making the observations to the 20% that have problems to made the program, this made during 6 months, in June 2016 it made 20 culture hand surface, random, to the NICU staff, with the following results; 13 without development, 3 culture develop Klebsiella pneumoniae, and 4 culture with Streptococcus aureus. With an improvement of 65% of the cultures negative and a 35% cultures positives, with this results, was necessary to apply the wash hand course again to all the NICU staff, specially to the staff that had a culture hand surface with a pathogenic bacterial, applying a random supervision, with a good attachment by the most of the personal by the 90% of the personal, making the observations to the 10% that have problems to made the program, in September 2016, 3 months later, it made 20 culture hand surface, random, to the NICU staff, with the following results; 16 without development, 3 culture develop Pseudomonas aeruginosa, and 1 culture with Streptococcus aureus, with improvement of the 80% and having a 20% of the culture positives. (Figure 1)

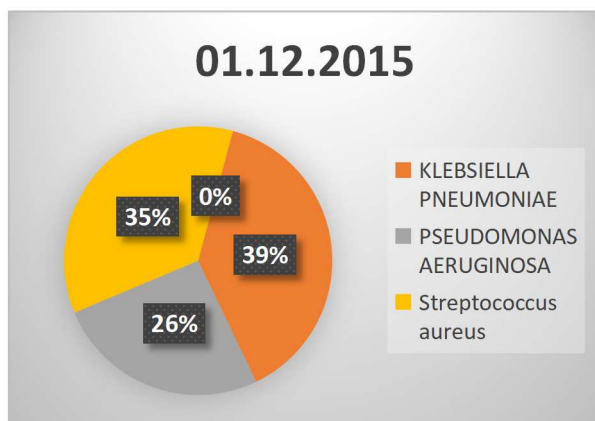


Figure 1

In December of 2016 in the hospital was born 4360 new borns, with 348 new borns who needed hospitalized, of those, 254 patients had neonatal sepsis diagnosis, that year occurred 65 deceases associated by neonatal sepsis, with a incidence rate of 0.72, a mortality rate of 14.9 by 1000 new born alive. With an increase of the incidence rate of 65% and an increase of the mortality rate of 54%, compared with the previous year. With this results, it decide to continue the wash hand program adding, working together with the catheters program, increase the surveillance in the venous central acceses, so in January of 2017 it applies 20 cultures in insertion sites of central venous acceses, random, in the patients that were in NICU and had venous central acceses, with the following results; 11 cultures with Streptococcus aureus, 7 with Pseudomonas aeruginosa, and 2 culture with development of Candida spp., with this results we made the capacitation to the NICU staff, (medical and nurses) that were involved with the installation and

manipulation of the venous central acceses (installation, medication apply, solution apply, catheter healing and care),

also it apply a verification list (figure 2) to evaluate the colocation, maintenance, and the removal, 4 months latest, in May 2017, made the insertion site of the venous central acceses, the cultures have the next results; 15 cultures without development, 2 cultures with Candida spp and 3 with Streptococcus aureus, it see an improvement of the cultures with 75% negative culture and 25% with development of a pathogen. It has to continues with the capacitation and the supervision, and in October 2017 with a new control of cultures of insertion site of the venous central acceses, finding 20 cultures 18 without development, 2 with Candida spp with improvement of 90% and persistence of 10% of the cultures with development of a pathogen. With the wash hand program, it continues applying supervision random and found that had an 85% in the NICU staff that continues with a good wash hand technique, and do not made cultures in hand in the NICU staff. (Figure 2)

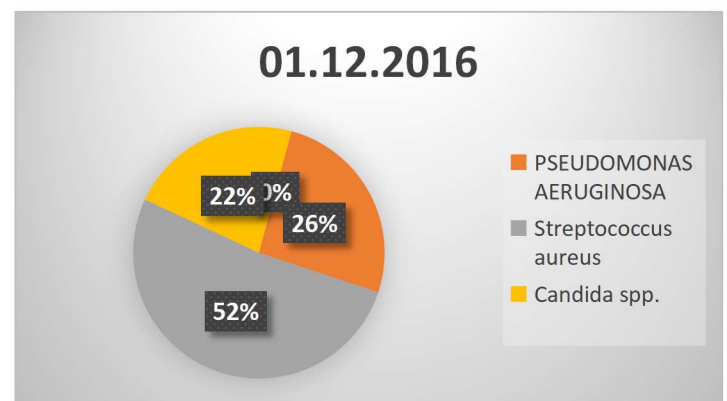


Figure 2

In December of 2017 in the hospital was born 4028 new borns, with 322 new borns who needed hospitalized, of those, 207 patients had neonatal sepsis diagnosis, that year occurred 38 deceases associated by neonatal sepsis, with an incidence rate of 0.64, a mortality rate of 9.4 by 1000 new born alive. With a decline of the incidence rate of 11% and an decline of the mortality rate of 36%, compared with the previous year. With this results, it decide to continue the wash hand program and the surveillance of the venous central acceses, so in January of 2018 it applies 20 cultures, 10 culture in hand surface and 10 cultures in insertion sites of central venous acceses, random, in the NICU staff and in the patients that were in NICU and had venous central acceses, with the following results; 10 cultures made in hand surface has 8 cultures without development, 1 culture with Candida spp., 1 culture with Klebsiella pneumoniae, and 10 cultures made in the insertion site of the venous central acceses, has 7 cultures without development 2

cultures with *Candida* spp and 1 culture with *Streptococcus aureus*. With this results its made a new capacitation in wash hand and the management of venous central catheter with the supervision of both programs an 6 months later, in jun 2018,

made new cultures with the following results; 10 cultures made in hand surface has 9 cultures without development, 1 culture with *Candida* spp., and 10 cultures made in the insertion site of the venous central acceses, has 7 without development, 2 with *Streptococcus aureus* 1 cultures with *Candida* spp. (Figure 3)

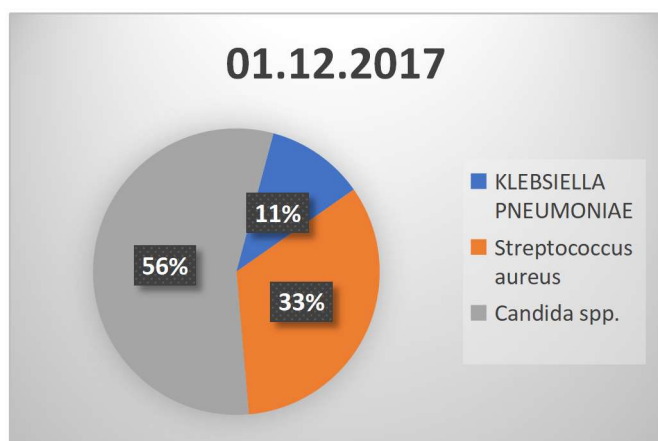


Figure 3

In December of 2018 in the hospital was born 3643 new borns, with 291 new borns who needed hospitalized, of those, 228 patients had neonatal sepsis diagnosis, that year occurred 25 deceases associated by neonatal sepsis, with an incidence rate of 0.98, a mortality rate of 6.8 by 1000 new born alive. With a rise of the incidence rate of 53% and an decline of the mortality rate of 27%, compared with the previous year. With this results, it decide to continue the wash hand program and the surveillance of the venous central acceses. In January of 2019 it applies 20 cultures, 10 culture in hand surface and 10 cultures in insertion sites of central venous acceses, random, in the NICU staff and in the patients that were in NICU and had venous central acceses, with the following results; 10 cultures made in hand surface has 7 cultures without development, 2 cultures with *Klebsiella pneumoniae*, 1 culture with *Stenotrophomona maltophilia*, and 10 cultures made in the insertion site of the venous central acceses, has 8 cultures without development 1 culture with *Candida* spp and 1 culture with *Klebsiella pneumoniae*. With this results its made a new capacitation in wash hand and the management of venous central catheter with the supervision of both programs an 6 months later, in jun 2019, made new cultures with the following results; 10 cultures made in hand surface has 8 cultures without development, 1 culture with *Klebsiella pneumoniae*, 1 culture with *Candida* spp., and 10 cultures made in the insertion site of

the venous central acceses, has 7 without development, 2 with *Candida* spp., 1 cultures with *Klebsiella pneumoniae*. (Figure 4)

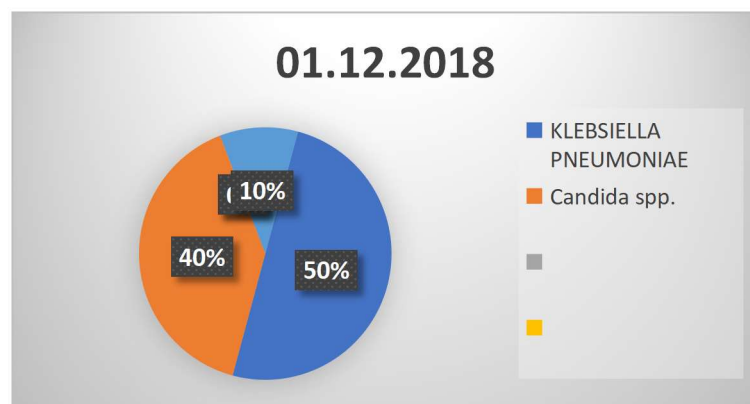
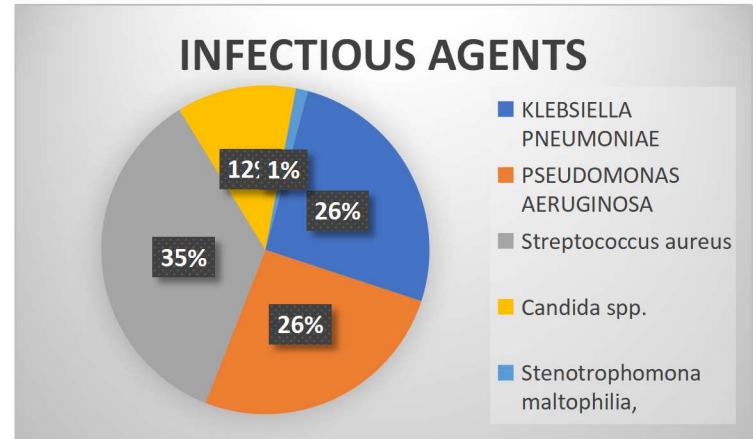
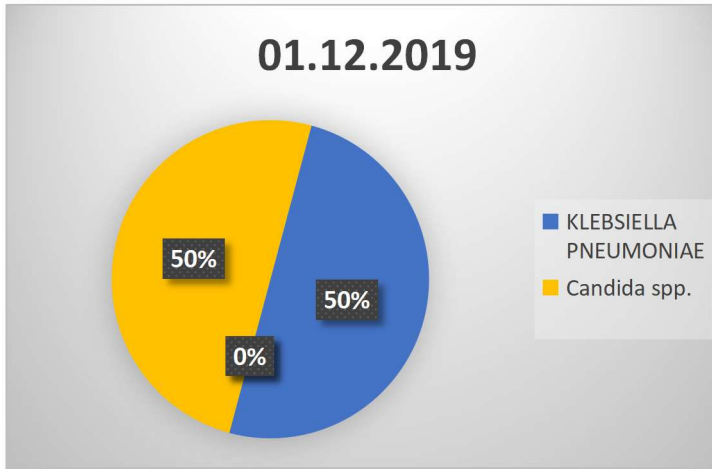


Figure 4

In December of 2019 in the hospital was born 3414 new borns, with 273 new borns who needed hospitalized, of those, 229 patients had neonatal sepsis diagnosis, that year occurred 30 deceases associated by neonatal sepsis, with an incidence rate of 1.19, a mortality rate of 8.79 by 1000 new born alive. With a rise of the incidence rate of 21% and a rise of the mortality rate of 29%, compared with the previous year. With this results in January of 2020 it applies 15 cultures in inert surfaces, 7 in radiant heat cots, 2 in oxygen source, 2 of the desk where the medicament is prepare, 1 of the source of the soap, 1 of the water source, with the following results; the cultures of radiant heat cots 4 cultures was without development, 3 cultures with *Klebsiella pneumoniae*, the 2 cultures of the oxygen source was without development, the 2 cultures of the desk where prepare the medications, development *Candida* spp., the culture of the source of soap without development, the culture of the water source without development, also it applies 20 cultures, 10 culture in hand surface and 10 cultures in insertion sites of central venous acceses, random, in the NICU staff and in the patients that were in NICU and had venous central acceses, with the following results; 10 cultures made in hand surface has 6 cultures without development, 1 culture with *Candida* spp., 3 cultures with *Klebsiella pneumoniae*, and 10 cultures made in the insertion site of the venous central acceses, has 8 cultures without development 1 culture with *Candida* spp and 1 culture with *Klebsiella pneumoniae*. With this results its made a new capacitation in wash hand and the management of venous central catheter with the supervision of both programs also it saw that the cleaning staff was change, and the new staff has a lot of deviations in the application of the techniques of cleaning so it made a new course to capacitated the staff in cleaning critical areas.(Figure 5)



Graph 1

About the mortality in the 2016 it can see that an increase in comparison with 2015, it atribuit this increase because despite the capacitation, evaluation and the supervision, not all the staff compromise with the program, it can see because the supervision to those staff that have a positive culture despite the supervision, also it can't be forced to participate. We try to influence to the most of the staff an when it include the supervision of the central venous acceses we see more participation of the staff, and it see that in 2017 and 2018 a decrease of the mortality, with this results the staff be very proud of participate and it want to keep, but in 2019 it see a raise of the mortality, it attribute that the cleaning staff was change, and the new staff has a lot of deviations in the application of the techniques of cleaning so it made a new course to capacited the staff in cleaning critical areas. (GRAPH 3)



Graph 2

In this study the actions that were implemented are simple actions, which have been tested in various countries with adequate results to avoid nosocomial infections, as well as the actions that are within our reach to reduce this condition. It can

Figure 5

Conclusion

The Maternal - Pediatric Hospital of Atizapan Guadalupe Victoria is a governmental institute were the population of the nearest counties have an opportunity to have an attention by gynecologist, pediatrician and neonatologist also a staff of specialized nurses. It has a 9 neonatal intensive care unit and 9 of neonatal intermedia care unit and by the demand of attention always have the 18 cribs occupied. With this number of patients and the peculiar characteristics of each one the possibility of have an infection when they get to this unit or get an infection during they stay increase with every day. The neonatal sepsis is a pathology that affect all around the world, the World Health Organization and no governmental organizations made many recommendations to try to decrease the incidence of this pathology. (4,5,7,8)

In 2015 we saw a rise in the defuntion in new borns with the diagnostic of neonatal sepsis, in the NICU area, worry about in 2016 it turned to take the wash hand program to saw the problems that have the staff to apply this program, with the cultures that was apply have the evidence of were is the problem, so we focus the efforts to sensitize the staff of the important to apply this program and increase the supervision of the staff of the UCIN. It saw after this with a good acceptance of the staff and participate very active. In this study it can se that patoghgen agents of the NICU was Klebsiella pneumoniae in a 26%, Pseudomona aergoenes in a 26%, Streptotococus aureus in a 35%, Candida spp. 12% and Stenotrophomona maltophilia in a 1%, this patoghens match with the patogens of other NICUS reports in other hospital both in the country and in other countries. (15,16,18,) (Graph 1)

see that the application of this simple programs and the constant supervision can decrease the mortality rate, also reflected in the decrease of positive cultures, that it is true do not eradicate at all the pathogens of the area, the decrease of the presence of pathogens was enough to decrease the mortality rate. Also is important to sensitize all the staff of this area, although their attention capacity is not in doubt, they give little importance to infection prevention programs, so making them aware and keeping them involved in such actions allows us to maintain adequate participation in these programs, which does not result a decrease in deaths from neonatal sepsis.

The participation of all those involved in perinatal care is required in order to save patients from neonatal sepsis, it is a difficult path since many do not believe that their actions can increase the presence of sepsis and harm third parties, although campaigns of awareness of sepsis cannot reach everyone, both close monitoring and analysis of each patient must be continued in order to reduce them.

Biography:

Dr.Francisco Javier Sanchez Reyes, master in health administration system, specialist in pediatrics since 2005, chief in charge of pediatrics division in General Hospital of Tlalnepantla since 2016 to 2018, sub chief in charge in pediatric division in Maternal – Pediatric Hospital of Atizapan since 2018 to the actuality, in private consulter since 2005.

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