Inside out: treating infants with gastroschisis

For many parents the first images of their baby on the ultrasound is a joyful time. How many fingers? How many toes? Is it a boy or a girl? For some families however, they are told that something is not quite right. You mean my baby has a “birth defect?” On ultrasound some infants, about 4.3 out of 10,000 life births, are identified to have their intestines outside the abdomen called gastroschisis. This defect is caused when the abdomen does not fully close during the baby’s growth process and ends up leaving a hole for the internal organs to stick out of.

Fig. 1. Illustration of Gastroschisis Defect courtesy of the CDC-
https://www.cdc.gov/ncbddd/birthdefects/gastroschisis.html

This type of defect is treatable, but has a few requirements before returning to an everyday, regular lifestyle. These requirements are: successful surgery to repair the hole and place the organs back in the body, return to normal feeding routine and return to home. If all three of these things are accomplished on schedule, then the patient typically comes home healthier, quicker, and at a much lower cost. These three things led to our Gastroschisis treatment protocol.

The Nine-step protocol is as follows:

Pregnancy counseling with a team of doctors
Guided Ultrasound imaging of developing baby.
C-Section between 36 and 38 weeks, guided by imaging
Surgery within 2 hours of birth
Gentle handling of the organs once born
Place organs back inside and close the hole without injury
Measure the pressure inside of the bladder
Create belly button with the umbilical cord (As is normally done)
Monitor the pressure of the bladder until patient is sent home

This protocol was started in 1998 at the Children's Hospital of Illinois and has been in place ever since. All cases between 1998 and 2017 were explored to see how all the patients did over that time frame. In total, 150 babies were treated with this birth defect between 1998 and 2017. Of those 150, 128 of them were repaired simply without any further difficulties. This paper reviews those 128 simple repairs. These simple repairs were then broken up into two groups depending on how the defect was repaired. The first group of 97 is known as a primary repair, meaning that it was fixed by putting the organs back into the body then sewing up the hole. The second group of 31 is known as a silo repair, meaning they use a bag to cover the organs, then slowly place them back into the body over a few days. Once everything is inside the hole is closed. When looking at how the babies recovered, the primary repair technique on average had the babies fed (normal feeding on day 19) and out of the hospital quicker (Sent home on day 22.5), compared to those with the "Silo" repair (normal feeding on day 26 and sent home on day 33).

Authors	Current Series (2018)		Banyard D, Et al. (2009) [24]		Stanger J, Et al. (2014) [23]		Gurien L, Et al. (2017) [31]	
Repair Type	Primary (n=97)	Silo (n=31)	Primary (n=188)	Silo (n=47)	Primary (n=300)	Silo (n=369)	Primary (n=364)	Silo (n=263)
Normal Feeding Resumed	Day 19	Day 26	Day 28.5	Day 36.5	Day 44	Day 43.6	n/a	n/a
Sent Home (Average)	Day 22.5	Day 33	Day 40.5	Day 46.5	Day 55.6	Day 53.8	Day 36.4	Day 41.5
Estimated Primary Repair Cost Savings	n/a		$10,152,000		$29,790,000		$15,178,000	

Fig. 2. Table of Gastroschisis patient outcomes.

With that in mind, this protocol compared to traditional methods is more effective. The babies fed quicker, were sent home quicker and saved the hospital money and resources. An average day in a hospital baby unit costs $3000 per day. After looking back at this new protocol, it appears to

provide a lot of benefits to effectively treating the abdominal birth defect of gastroschisis.

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Publication

Single center protocol driven care in 150 patients with gastroschisis 1998-2017: collaboration improves results.
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