

Dangers and expenses of a first-level Obstetrics facility: a serious Italian concern

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ABSTRACT

Purpose. Estimate the expense of an Obstetrics facility with more than 500 births/year and less than 1000 births/year.

Methods. Starting from 1262 hospitalizations, we assessed the outcomes of each hospitalization (Cesarean section, operative vaginal delivery, hospitalization in pregnancy without delivering, hospitalization after delivering for puerperal complications) and combine them with days of hospital stay (with a scoring system) and with rates of pregnancy complications. Therefore, we estimated the expense like increase of resources absorption for pregnancy complication. Multivariable logistic e multilinear regression analyses was used for inference.

Results. Increase in resources absorption is: 8.4% for hypertensive disorders of pregnancy, 6.7% for gestational diabetes mellitus, 2% for intrahepatic cholestasis, 2.7% for intrauterine growth restriction, 17.8% for premature rupture of membranes, 10.6% for oligohydramnios/polyhydramnios, 31.9% for previous Cesarean, 19.8% for other complications.

Discussion. As Cesareans cause directly and indirectly the rise in expense, it should be avoided. However, the rise in Cesareans sections is justified by the unavailability of the operating room to allow a Cesarean sections in emergency. Despite governative efforts, this is still a serious concern for first-level Obstetrics units in Italy.

Keywords: Cesarean section, expense, health policy.

INTRODUCTION.

Since 2008, the parliamentary commission of inquiry on the errors in health field and on the causes of regional income deficit has assessed many items of obstetrical care, concluding that hospitals with low numbers of birth/year provide a worst care in labour and delivery in Italy⁽¹⁾. This behaviour should have an immediate impact on health expense. After this warning, a governative effort has provided a reorganization of hospitals with low number of birth, aiming to improve obstetrical care thereby reducing health expense⁽²⁾. We judge that this efforts have been vain.

The aim of this report is to estimate the expense of an Obstetrics facility with more than 500 births/year and less than 1000 births/year (after reorganization, the facility is labeled as a first level Obstetrics unit), highlighting which kind of obstetrical complication is most

SOMMARIO

Scopo. Stimare la spesa sanitaria di una struttura di primo livello ostetrico (fra 500 e 1000 parti l'anno). **Metodi.** A partire da dati amministrativi di 1262 ospedalizzazioni, sono stati valutati gli esiti di ciascun ricovero (Cesareo, parto operativo vaginale, ricovero in gravidanza senza parto, ricovero in puerperio dopo il parto) e sono stati combinati con i giorni di degenza (con un sistema a punteggio) e con le frequenze delle complicazioni della gravidanza. Pertanto, è stato possibile stimare la spesa sanitaria come incremento nell'assorbimento di risorse. Sono state usate la regressione logistica multivariata e la regressione multilineare per inferenza.

Risultati. L'incremento nell'assorbimento di risorse avviene: per l'8.4% per disturbi ipertensivi della gravidanza, per il 6.7% per il diabete gestazionale, per il 2% per la colestasi intraepatica della gravidanza, per il 2.7% per lo IUGR, per il 17.8% per le rotture premature di membrane, per il 10.6% per le diagnosi di oligoamnios o poliamnios, per il 31.9% per i cesarei progressi, per il 19.8% per altre complicazioni.

Discussione. Siccome sono i Cesarei a causare direttamente ed indirettamente l'aumento della spesa sanitaria, bisognerebbe evitarli. L'aumento dei tagli Cesarei è comunque giustificato dalla indisponibilità della sala operatoria per consentire un taglio cesareo in emergenza. Nonostante l'impegno governativo, questo è ancora un grave problema per le strutture ostetriche di primo livello in Italia.

expensive, and discussing the reasons of such expenses.

MATERIALS AND METHODS

Administrative data from the 2013 to June 2014 were extracted from the whole hospitalized patients of the Complex Operative Unit of Obstetrics and Gynecology of Civitanova Marche, Area Vasta 3. This is a first level Obstetrics unit, with number of deliveries between 500 and 1000/years. Data were limited to the hospitalizations of the second and third trimester of pregnancy (1262 hospitalizations). In the second and third trimester of pregnancy, the obstetrical complications of a low-risk Obstetrics setting were screened and managed according with the resources of the Obstetrics unit (by referring the preterm pregnancies below 34 weeks to a second level unit, without initiating an hospitalization if possible). Therefore, we are able to assess a very small sample of hospitalized patients in

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which outpatient screening of complications was ineffective along with a wide proportion of low-risk pregnant admitted to the Obstetrics unit.

We check the diagnosis-related groups (DRGs) for pregnancy complications and for obstetrical interventions for assessing the primary outcomes of pregnancy complications in this sample. Moreover, administrative data were able to provide days of hospital stay and duplicate hospitalizations during pregnancy or in the puerperal period.

To estimate the expense, we combine the outcomes of each hospitalization (Cesarean section, operative vaginal delivery, hospitalization in pregnancy without delivering, hospitalization after delivering for puerperal complications) with days of hospital stay. A scoring system was adopted as following. The "expense score" was built by summing the outcomes Cesarean section (score 2, if present), operative vaginal birth (score 1, if present), hospitalization without delivering (score 1, if present), puerperal complications (score 1, if present), along with days of hospital stay. This score estimates the increase of resources absorption in case of Cesarean (most physicians and nurses efforts, more drugs use, occupation of delivery room, etc.), in case of operative delivery (more drugs use, more efforts of midwives and Obstetricians), in case of duplicate hospitalizations for complications during pregnancy and after delivery (duplicate efforts of nurses, physicians, midwives, drug use, etc.). The increase of resources absorption is directly related with health expenses, who cannot be exactly quantized.

Logistic regression analyses and multilinear regression analyses were built for assessing which complication of pregnancy independently associates with outcomes (Cesarean section, operative vaginal delivery, hospitalization without delivering, puerperal complications), with days of hospital stay and with the "expense score". We do not insert in statistical analyses the complications of pregnancy occurred in labour (fetal distress or intrapartum cardiotocographic abnormalities and dystocia during labour), because those complications in a low-risk population are considered as causing normal resources absorption in routine obstetrical care.

The regression coefficients calculated for the "expense score" was corrected for the rate of pregnancy complications (unstandardized coefficient of regression * rate of pregnancy complication, as coded by DRGs), and converted in a percentage scale of increasing in resources

absorption. SPSS 16.0 was used for calculations. $p < 0.05$ was set for significance.

RESULTS.

Table 1 provides rates of principal complications of pregnancy and portrays the odds of a given outcome (Cesarean section, operative vaginal birth, hospitalization in pregnancy without delivering, hospitalization after delivering for puerperal complication). The Table 1 provides also the unstandardized coefficients for days of hospital stay and for the expense score along with the percentage scale of increase in resources absorption for each pregnancy complication. Both results of logistic regression analyses and of multilinear regression analyses are provided as multivariate results (odds ratios with 95% CI and unstandardized regression coefficients).

The hypertensive disorders of pregnancy have a rate of 2.5% among DRGs. They associate more often with Cesarean sections, with hospitalizations without delivering and with a long lasting time of hospitalizations. They are the most expensive complication for a low-risk Obstetrics unit, but, in light of they low rate, they do not absorb an high amount of resources (estimated increase of resource absorption: 8.4%). Gestational diabetes mellitus, as diagnosed by using the new restrictive criteria⁽³⁾, slightly increases the odds to undergo Cesarean section, thereby absorbing 6.7% of increasing in resources. Intrahepatic cholestasis of pregnancy is uncommon and seems to need more hospital stay without causing any significant change in other outcomes (increasing in resources absorption: 2%). Same behavior seems to have the intra-uterine growth restriction (IUGR) diagnosis (increasing in resources absorption: 2.7%). Premature rupture of membranes (PROM) diagnosis is common (16% of DRGs) and leads to more Cesarean sections and hospital stay (increasing in resources absorption: 17.8%). Oligohydramnios and polyhydramnios are less common diagnosis (5.1% of DRGs) but cause more hospitalization time with a 10.6% of increasing in resources absorption. Previous Cesarean section is the commonest complication of pregnancy (12.1% of DRGs) and is always managed with a repeated Cesarean in the Obstetrics unit of Civitanova Marche, thereby causing more re-admission for puerperal complications (usually post-surgical complications) and, therefore, most increase in resources absorption (31.9%).

Finally, other complications (rate 8.1% of DRGs) cause an increase in resources absorption of 19.8%, needing more often a Cesarean section, more hospitalizations without delivering, more hospital stay. Those complications are mainly: breech presentation (24.3%), other malpresentations or mechanic dystocia not occurring in labour (11.7%), tween pregnancies (6.8%), placenta abruption (5.8%), intrauterine fetal deaths (3.9%), placenta praevia (2.9%) and miscellaneous complications (38.8%). Among the latter group, there are some gynecologic pathologies (leiomyomas, ovarian cysts, adhesions, endometriosis), unspecified bleeding, infectious diseases, cord disorders, venous disorders.

DISCUSSION.

In this first level Obstetrics unit, the most expensive complication of pregnancy is the group of hypertensive disorders of pregnancy,

but the most important absorption of resources is the diagnosis of previous Cesarean. Such behaviour could be generalized to the majority of low-risk Obstetrics unit in Italy. Italian practice guidelines suggests to offer a trial of labour after Cesarean if the Obstetrics unit is able to provide an immediate access to the operating room(4). However, many first-level Obstetrics unit in Italy are not able to allow an emergent Cesarean in case of suspected uterine rupture. This problem is due to the structural criticality of many hospitals who have not the operating room close to the delivery room. Additionally, the operating room could be not immediately available for a Cesarean even if it is close to the delivery room. Therefore, for preventing an harmful loss of time, Obstetrics and Gynecologists are forced to plan a repeated Cesarean. The repeated Cesarean realizes the 31.4% of Cesareans in Italy⁽⁵⁾. This rate could be significantly reduced, because 60% of women with a previous Cesarean delivers vaginally⁽⁶⁾.

Preventing unnecessary repeated Cesareans in

Table 1

Statistical calculation

	Outcomes				Indicators of expense		
	Cesarean section	Operative vaginal delivery	Hospitalizations without delivering	Puerperal complications	Days of hospital stay	Expense score (days of hospital stay + outcomes)	Overall estimation of the expense (score coefficient x complication of pregnancy rate)
	odds ratio 95% CI P	odds ratio 95% CI P	odds ratio 95% CI P	odds ratio 95% CI P	Unstandardized coefficient P	Unstandardized coefficient P	Percentage of resources absorption
Hypertensive disorders of pregnancy 2.5%	6.498 2.732-15.454 p<0.001	2.470 0.300-20.301 N.S.	4.106 1.327-12.702 p=0.014	0.631 0.083-4.796 N.S.	1.298 p<0.001	2.018 p<0.001	0.05 8.4%
Gestational diabetes 8.7%	1.916 1.152-3.189 p=0.012	1.548 0.334-7.185 N.S.	1.584 0.596-4.205 N.S.	0.305 0.074-1.266 N.S.	0.194 N.S.	0.458 p=0.025	0.04 6.7%
Intraepathic cholestasis of pregnancy 1%	2.244 0.585-8.618 N.S.	/	/	1.905 0.226-16.096 N.S.	0.284 N.S.	1.180 p=0.046	0.012 2%
IUGR 1.7%	1.039 0.315-3.425 N.S.	/	1.239 0.157-9.770 N.S.	/	0.528 N.S.	0.929 p=0.038	0.016 2.7%
PROM 16%	2.626 1.776-3.882 p<0.001	0.313 0.041-2.394 N.S.	0.159 0.022-1.174 N.S.	1.108 0.574-2.139 N.S.	0.309 p=0.019	0.660 p<0.001	0.106 17.8%
Polyhydramnios/ oligohydramnios 5.1%	1.884 0.977-3.636 N.S.	/	1.321 0.381-4.577 N.S.	1.647 0.630-4.308 N.S.	0.492 p=0.024	1.227 p=0.038	0.063 10.6%
Previous Cesarean section 12.1%	189.649 79.716-437.022 p<0.001	/	0.748 0.256-2.182 N.S.	0.210 0.051-0.865 p=0.031	0.210 N.S.	1.568 p<0.001	0.19 31.9%
Other complications 8.1%	9.739 6.079-15.603 p<0.001	0.790 0.101-6.155 N.S.	3.569 1.617-7.879 p=0.002	1.843 0.881-3.854 N.S.	0.679 p<0.001	1.459 p<0.001	0.118 19.8%

low-risk Obstetrics unit is cost-effectiveness but would lead to a governative policy of building new hospitals for allowing the trial of labour after Cesarean with the operating room immediately available. Such an organization is also safe, and prevents injuries from other complications of pregnancy needing an emergency use of operating room. However, currently, building new hospitals would dissipate a lot of economic resources in Italy and it does not seem feasible.

To slightly reduce the expense of a low-risk Obstetrics facility, it could be improved the diagnosis and management of oligohydramnios and of polyhydramnios (rate 5.1% of DRGs) and the management of malpresentation and twin pregnancies (group of other complications of pregnancy, rate 8.1% of DRGs). The sonographic evaluation of amniotic fluid volume should be improved avoiding unnecessary interventions⁽⁷⁾. External cephalic version for breech presentation⁽⁸⁾ and fetal head digital rotation for persistent posterior position^(9,10,11), or other

obstetric manoeuvres could be able to reduce the number of Cesareans as well, thereby reducing the cumulative increase in previous Cesareans by years. However, if an Obstetrics and Gynecologist chooses to perform an external cephalic version or another obstetrical manoeuvre attempting to avoid a Cesarean, he should be aware that sometimes he needs to perform an emergent Cesarean section for complications occurring at the time of that manoeuvre. Again, in a first-level Obstetrics unit, those complications are difficult to manage without the immediate availability of the operating room.

In conclusion, the unavailability of an operating room in the first level Obstetrics units is dangerous and causes an extraordinary rise in expense for the Italian health system, because Obstetrics and Gynecologists are forced to perform planned Cesareans for the best of prudence. This is still the most serious concern for the first level Obstetrics facilities in Italy.

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