group 3, is associated with a poor surgical prognosis (width cleft, short lower maxillary bone, and curvilinear nasal septum (NS)).

Methods: Every case of fetal UCLP between 2006 and 2011 in Montpellier Hospital Center was reviewed. 3D axial plane images and multiplanar rendering images were extracted and interpreted both by an independent sonographer (operator 1) and maxillofacial surgeon (operator 2) in order to asses inter and intra-observer variability. The evaluation criteria were based on the symmetry of the palate, the shape of the NS and the measurement of the septal deviation (in degrees). Then, a biometric analysis was undertaken according to the different classes.

Results: 16 fetuses were included in the study with a median gestational age at 3D acquisition of 28 weeks (22 to 34 weeks). The reliability was moderate. The mean normalised width of cleft was for operator 1 (group 2: 7.2 mm+/−3.4, group 3: 12 mm+/−2.2, group 4: 11.4 mm+/−1.9) and for the operator 2 (group 2: 7.6 mm+/−2.6, group 3: 13.1 mm+/−2.3, group 4: 10.2 mm+/−3.1). The mean septal deviation for operator 1 was: group 2: 10.9°+/−6, group 3: 20.8°+/−1.4, group 4: 14.2°+/−2; and for the operator 2 was: group 2: 8.6°+/−7.2, group 3: 20.5°+/−2.3, group 4: 15.7°+/−3.3.

Conclusions: This study enabled us to apply postnatal classification to prenatal images: group 1 (harmonious form, alveolar notch and rectilinear septum), group 2 (harmonious form, rectilinear septum and width cleft < 10 mm), group 3 (dysharmonious form, curvilinear septum, large cleft and septal deviation) and group 4 (dysharmonious form, rectilinear septum, small septal deviation and large cleft). This method also enabled us to build a diagnostic organogram with the classification that could be used for parents during prenatal counselling.

OP23.07

"Pseudo-feeders" on fetal MRI: a new marker to predict outcome in vein of Galen aneurysmal malformations

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Objectives: While vein of Galen aneurysmal malformations (VGAM) can be diagnosed in the fetus, the challenge is predicting the occurrence of its two major complications: cardiopulmonary failure and encephalomalacia. This study attempts to determine which fetal brain MRI features might be used to predict the development of these complications at birth.

Methods: The cohort was extracted from a prospectively-assembled database of VGAM cases managed at a single referral centre from 2000 to 2014. Of 251 patients with VGAM, 83 cases were diagnosed prenatally. A total of 58 patient charts having at least one fetal MRI were reviewed. Patterns of brain parenchyma, hydrocephalus and so-called middle cerebral artery (MCA) "pseudo-feeders" were correlated with cardiac failure, pulmonary hypertension and encephalomalacia at birth.

Results: The median gestational age at fetal MRI was 32.3 WP (±2.3). Nine fetuses (16%) had encephalomalacia. Thirty-one fetuses (53%) had MCA pseudo-feeders. Twenty-six fetuses (45%) had prenatal hydrocephalus. Prenatal MCA pseudo-feeders were a risk factor for encephalomalacia at birth ($p = 0.001$). MCA pseudo-feeders and hydrocephalus were risk factors for both severe cardiac failure ($p = 0.01$ and $p = 0.04$, respectively) and severe pulmonary hypertension ($p = 0.014$ and $p = 0.05$, respectively) at birth.

Conclusions: MCA pseudo-feeders are the result of impaired cerebral blood flow, and are thus a risk factor for further brain-melting at birth. Their presence can be used for informing parents and as an aid in management decisions.

OP23.08

Prenatal ultrasound screening of intestinal malrotation with a risk of volvulus: value of the relative position of the superior mesenteric vessels

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Objectives: The aim of this study was to assess the value of an unusual relative position of the superior mesenteric artery (SMA) and vein (SMV) to screen intestinal malrotation with a higher risk of volvulus.

Methods: This was a prospective descriptive study conducted in our University's Hospital Center during four years (2012–2015). Evaluation of the relative position of the superior mesenteric vessels was performed during the routine second trimester ultrasound screening. Inclusion criteria were all fetuses between 19 to 22 weeks of gestation with no congenital malformation. The standard pediatric technique was followed. The relative position of artery and vein was defined on the abdominal axial scan including the visualisation of the left renal vein. For each fetus, the relative position of the vein was defined on the right, in front of or on the left of the artery. Normal position was defined as the vein on the right side of the artery. Other position was considered as unusual. If unusual position was diagnosed, prenatal MRI and newborn postnatal barium enema and upper gastrointestinal series were performed.

Results: 4000 patients were scanned during the four years period with 36 fetuses excluded because of impossibility to visualise the superior mesenteric vessels leaving finally 3964 included fetuses. Normal position of mesenteric vessels was found in 3949 fetuses. 15 unusual relative positions were diagnosed: 12 cases corresponded to the SMV on the left side of the SMA (2 fetuses confirmed as high risk of intestinal malrotation and 10 others as low risk) and 3 cases corresponded to the SMV in front of the SMA (finally considered to have no intestinal malrotation).

Conclusions: Prenatal ultrasound assessment of the relative position of the superior mesenteric vessels might provide useful information in fetuses with intestinal malrotation. When the SMV are located on the left side of the SMA, further imaging evaluations in newborn are necessary to affirm diagnosis.

OP23.09

Antenatal automatic diagnosis of cleft lip via unsupervised clustering method relying on 3D facial soft tissue landmarks

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Objectives: Ultrasound (US) is the first-choice device to detect different types of facial dysmorphisms. Anyway, at present no standard protocol has been defined for automatic nor semi-automatic diagnosis. Even though the practitioner's contribution is core, steps towards automatism are to be undertaken. We propose a methodology for diagnosing cleft lip on 3D US scans.

Methods: A bounded Depth Minimum Steiner Trees (D-MST) clustering algorithm is proposed for discriminating groups of 3D US faces relying on the presence/absence of a cleft lip. The analysis of 3D facial surfaces via Differential Geometry is adopted to extract landmarks. Thus, the extracted geometrical information is elaborated to feed the unsupervised clustering algorithm and produce the classification. The clustering returns the probability of being affected by the pathology, allowing physicians to focus their attention on risky individuals for further analysis.

Results: The feasibility is tested upon the available 3D US scans data and then deeply investigated for a large dataset of adult individuals. 3D facial Bosphorus database is chosen for the testing, which seven cleft lip-affected individuals are added to, by artificially creating the defect. The algorithm correctly separates left and right-sided cleft lips, while healthy individuals create a unique cluster; thus, the method shows accurate diagnosis results.

Conclusions: Even if further testing is to be performed on tailored datasets made exclusively of fetal images, this techniques gives hefty hints for a future tailored algorithm. This method also fosters the investigation of the scientific formalisation of the "normotype", which is the representative face of a class of individuals, collecting all the principal anthropometric facial measurements, in order to recognise a normal or syndromic fetus.

OP23.10

Fetal optic chiasm measurements: a simpler way!

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Objectives: Several years ago, our team published reference ranges of the measurement of the posterior branches of the optic tract following 3D acquisition. These ranges established from 22wks to 34wks, have demonstrated their potential in counselling parents in case of fetal septal agenesis. We aimed to obtain measurements of the same structure using a simpler method based on the 4D mode with VCI Plane A acquisition.

Methods: This study was performed using Voluson E8 and E10 (Kretz General Electric) with volumic probes RM6C an Em6C. The width of the posterior branches of the fetal optic chiasm were measured at 22 to 34 weeks of gestation by a single operator (JPB). The acquisition was performed in an axial plane at the level of the circle of Willis using VCI A plane, with a 3 millimetres thickness.

Results: One hundred fetuses were included in the study. The measurements obtained demonstrated good correlation as compared to the references ranges published in 2007.

Conclusions: We report a new and simpler way to measure the fetal posterior branches of the optic chiasm. This could help simplifying the acquisition of key information for the appropriate counselling of cases of septal agenesis.

Supporting information can be found in the online version of this abstract

OP24: IMAGING IN REPRODUCTIVE MEDICINE

OP24.01

A feasibility study of a new friendly and low-cost ovarian stimulation protocol for assisted reproduction

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Objectives: To evaluate the feasibility of a new friendly and low-cost controlled ovarian stimulation (COS) protocol in order to enable the design of a large randomised controlled trial (RCT).

Methods: All women undergoing COS for oocyte retrieval between Jan and Feb-2016 with ≤90Kg, 18–40 years, and with an antral follicle count (AFC) ≥ 9 were invited to participate. Those who agreed started COS on menstruation D2-3. They received oral letrozole 7.5 mg/d for 5 days and oral clomiphene citrate 100 mg/d until the triggering. On COS D3 they received a single dose of corifollitropin alfa 100mcg SC. Ultrasound monitoring started on D8 and proceeded every other day. The triggering was performed

OP24.01: Table 1.

	All participants (N = 40)			AFC 9–19 (N = 20)			AFC >19 (N = 20)		
	Median	IQR		Median	IQR		Median	IQR	
Age	32.7	30.2	36.1	35.6	31.0	38.1	32.2	29.1	33.7
BMI	24.8	22.9	28.3	24.5	21.9	25.9	25.3	23.5	30.4
Ovarian volume	5.4	4.1	7.6	4.3	3.6	6.1	6.2	5.2	9.1
AFC	19.5	13.0	28.5	13.0	10.3	16.8	28.0	21.0	37.3
OS duration	12.0	12.0	13.0	12.0	11.0	13.8	12.0	12.0	13.0
Follicle ≥ 14 mm	11.0	8.0	18.5	8.0	4.3	11.0	16.0	9.8	22.5
Oocytes	12.0	7.3	17.0	9.0	4.3	13.8	16.0	9.3	19.8
MII oocytes	9.0	5.3	14.8	7.5	4.0	11.3	13.0	8.3	16.8
Total MII	414			151			263		
Submitted to ICSI	224	54%		100	66%		124	47%	
Fertilised	162	72%		66	66%		96	77%	
Cleavage	151	93%		59	89%		92	96%	
Top quality D2	72	48%		25	42%		47	51%	