

PEDI

UPDATE

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you “**PEDI SMART**“ which contain latest and interesting news in the field of Paediatrics.

This issue contains:

1. **Comparing conventional scalpel and dual-waved laser methods in labial frenectomy**
2. **Effect of COVID-19 vaccination on glycemic control in adolescents and young adults with type 1 diabetes**
3. **Comparing the effects of propofol and ketamine on the emergence agitation following male circumcision**
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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

Comparing conventional scalpel and dual-waved laser methods in labial frenectomy

The band of mucosal folds that connects mucosa of the alveolar process of the maxilla and the upper lip of the central incisor is known as frenulum. The vertical growth of alveolar bone makes the frenulum's attachment move towards the apex and shrinks.¹ But the abnormalities in its size and location might cause the diastema of the front incisors, the limitation of the lip, speech and chewing, aesthetic problems and so on which can be solved with surgical excision. upper labial frenulum is attached abnormally it causes of excessive space between maxillary central incisor space. The recovery of the upper labial frenulum is also related to the prevention of central incisor suture formation, prevention of orthodontic recurrence, aesthetic psychological factors, diastema closure, bone loss for muscle traction, limitations in lip mobility brushing the maxillary anterior teeth with less traumatic pulling of the gingiva, and/or tethering of the upper lip by the frenum, leading to hypomobility of the philtrum of the upper lip and improved bilabial speech sounds.^{2,3} Histological studies illustrated that the collagenous fibers in the upper labial frenulum divide the periodontal tract, which is strongly linked with the middle maxillary space. The surgical excision of frenulum including periodontal muscle fibers is described as frenectomy. The scalpel was the classic frenectomy in the past decades with different methods, such as Miller's technique, Z plasty, and V-Y plasty. With the development of the laser, CO₂, erbium (Er): yttrium aluminum garnet (YAG), and neodymium-doped YAG (Nd:YAG) were used for frenectomy due to more patient acceptance, safer, less bleeding and more effectiveness. There are different ways of cutting soft depending upon the characteristics of different wavelengths of laser. The aim of this study was to compare the scalpel technique with the Er:YAG combined with Nd:YAG laser technology to complete the frenectomy procedure.

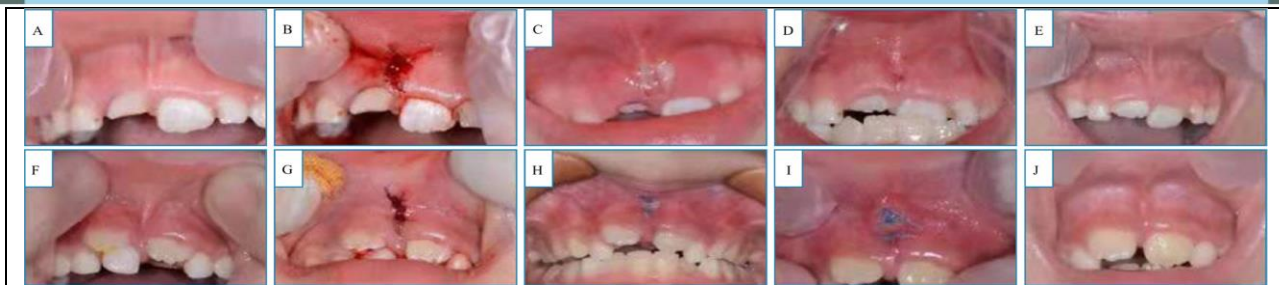
Nd:YAG laser is an efficient and more comfortable alternative to the scalpel for a frenectomy in upper lip frenulum.

Totally, 34 children (5–10 years old) were invited to participate in this study. The study is a simple randomized, double-blinded clinical trial, the subjects were divided into laser group and scalpel group. The inclusion criteria were according to (1) Mirko analysis: gingival papilla adhesion or through gingival papilla attachment (2) Maxillary midline space is larger than 2 mm (3) good physical health and oral hygiene. The randomization method was obtained the random number through the computer system formed the random assignment. The two groups were

compared for the following factors: surgical time and Visual Analog Scale (VAS) pain score, which includes intraoperative pain, postoperative pain and complications, such as speaking and chewing, for 1 day and 7 days following labial frenectomy. After 3 months, healing outcome was recorded by photos. The statistical analysis was done using χ^2 test, Wilcoxon rank-sum test, U test, sample t-test, SPSS software (V.22.0)

There was no statistically significant difference observed between the two groups in terms of the sex distribution or the average age. In this study the surgical time was calculated excluding the local anesthesia time. There was a statistically significant difference in mean surgical time between laser surgery (mean=224±59 s) and scalpel surgery (mean=740±168 s) ($p<0.001$). The pain during the intraoperative period, 3 hours after the operation and 1st postoperative day of pain, chewing and speaking scores were statistically higher in group B than those in group A. However, there was same result in the 7th postoperative day in terms of pain, but no significant difference in speaking and chewing. After 1 month, all of the patient results were recorded, including the healing of wound and scar. Except for one patient in group B who had a scar, good results were achieved in all patients

The aim of this study was fulfilled. The laser group has shorter surgical time when compared to scalpel group which is similar to the study conducted by Sarmadi et al. and a meta-analysis conducted by Protásio et al.^{4, 5} The laser frenectomy was 4 minutes shorter than scalpel method but advantageous to patients such as less intraoperative pain, less postoperative discomfort in speaking and chewing. In contrast with all other studies, this study combined Er:YAG and Nd:YAG lasers because of their separate traits. Er:YAG is highly efficient in the incision of soft tissue because it has a wavelength of 2940 nm. Nd:YAG laser has a wavelength of 1064 nm, so that soft tissue dissection is inefficient but has less chances of bleeding.¹ There are many kinds of lasers individually used in frenectomy surgery, but this study combined the advantages of the Nd:YAG and Er:YAG lasers. Er:YAG has the ability to disinfect the surgical site while cutting it accurately, while Nd:YAG can promote tissue healing and blood coagulation, sterilization and disinfection. The depth of incision during the operation for the scalpel group is difficult to calculate and the wound at the suture site may lead to the accumulation of plaque, and the postoperative swelling may cause the lip movement limitation and increase the chances of scar formation. Erbium laser does not need suture and has the function of hemostasis and sterilization. It can decrease the postoperative swelling, shorten the operation time, and avoid the trouble of suture removal and the fear and discomfort of suture removal in patients follow up visits. Some other studies reported that no number of analgesics used and quick wound healing with less scar tissue in laser technique than scalpel technique.⁶



Clinical images showing labial frenectomy with Er:YAG laser technology (A–E) and with the scalpel technique (F–J). A+F=before surgery, B+G=immediately after surgery, C+H=after 1 day, D+I=after 7 days, E+J=after 1 month. Er:YAG, erbium yttrium aluminum garnet

In conclusion, the abnormality of the labial frenulum causes space between maxillary central incisors. Taking into account the time of treatment for children, intraoperative pain, postoperative pain, speech, chewing and other factors, the effect of the combined treatment of bait and neodymium (Nd:YAG) laser is far better than the scalpel treatment. Frenectomy done with the dual-wavelength laser in pediatric patients is a useful, effective, comfortable and safe treatment method, but it also needs to be based on the clinical symptoms.

Choice of the method depends on effectiveness, acceptability and security. it is very important to consider the relative factors like equipment cost, to determine which is the optimal choice. Above all, two-waved laser may be considered as an option in frenectomy surgery as it leads to a significant improvement between intraoperative and postoperative pain.

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Effect of COVID-19 vaccination on glycemic control in adolescents and young adults with type 1 diabetes

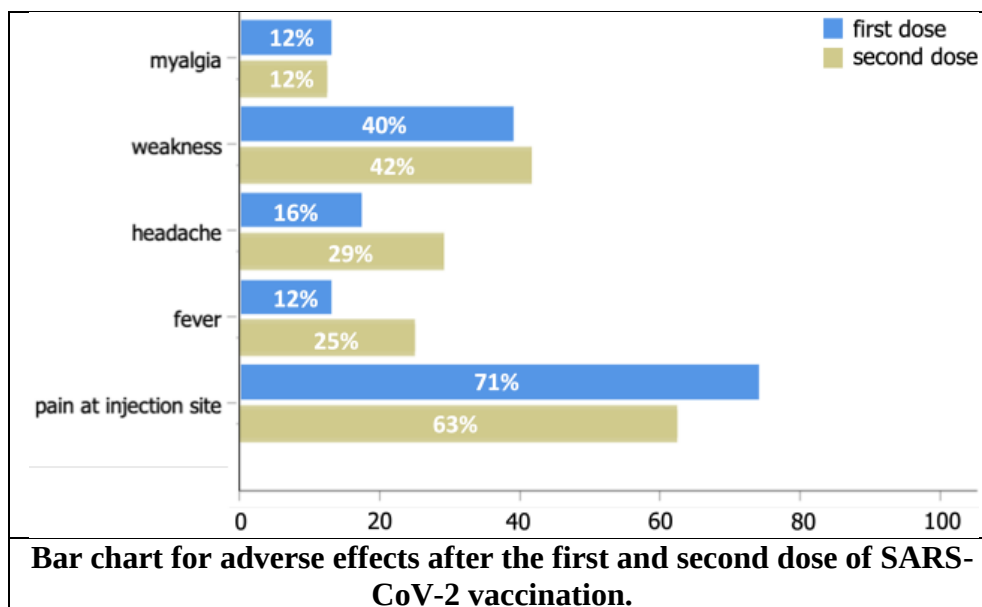
COVID-19 is caused by Severe acute respiratory syndrome corona virus 2 (SARS COV-2). The infection was mild in pediatrics compared to adults and was often asymptomatic and rare mortality. Anyways, the long-term effects of COVID-19 in children are unknown due to insufficient data.¹ Many studies illustrated that Multisystem inflammatory syndrome in children (MIS-C) is seen even after the mild infection.² Many studies reported Presence of co-morbidities like diabetes with obesity may increase risk of mortality and morbidity in COVID-19 patients.³ However these studies mainly are mainly regarding Type 2 diabetes and the same concepts cannot be applied to Type 1 diabetes. COVID-19 is more severe in Type 1 Diabetes (T1D) compared to other healthy individuals. Age is also considered as one of strongest risk factor.¹ There are only hand full of vaccines approved for use in pediatrics over 12 years by WHO. This study evaluated the adverse effects, possible glycemic control modification and temporary insulin dose adjustment in adolescents and young adults with T1D users of different levels of technology, who completed COVID-19 vaccination.

COVID-19 vaccination does not show significant changes in glycemic control in Adolescents and young Adults

This is a retrospective study of 39 T1D subjects were included in the study who completed their vaccination schedule with either Moderna or Pfizer- BioNTech vaccines. 24 of them were using advanced hybrid closed loop systems (AHCLs) and 15 were using intermittently scanned continuous glucose monitoring (isCGM). Symptoms after first and second dose ,time in range 70-180 mg/dl (TIR), time in different glucose ranges, mean glucose levels, coefficient of variation (CV), total daily dose (TDD) and bolus proportion were analyzed for 7 and 14 days before and following the each dose. Descriptive statistics for side effects, Shapiro-Wilk test , t test to were the statistical tools used. Data analysis was done using IBM SPSS Statistics v.25 software.

The study included 39 T1D patients, out of which 24 were using AHCLs and were using isCGM. In AHCLs subjects, 46% were vaccinated with Pfizer-BioNTech and 54% with Moderna. In isCGM patients 33% were vaccinated with Pfizer- BioNTech vaccine and 67% with Moderna. There was no significant differences observed in TIR, time in different glucose ranges, mean glucose levels, TDD, bolus proportion, were observed before and after any dose nor before and after the whole vaccination cycle among both the groups. There was significantly lower CV after whole vaccination in AHCLs patients. . The mild side effects like pain at injection site,

weakness, head ache, fever and myalgia were significantly higher after the second dose of vaccination. No severe side effects occurred during the study.



This study describes the effect of vaccination in adolescents and young adults over 16 years of age. The effects of COVID-19 vaccination are different in T1D and T2D patients. Age plays an important role in determining severity of the disease. The COVID-19 vaccination may tend to increase the glycemic levels due to the activation of immune system. Many studies reported worsening of the glucose levels after COVID-19 vaccination which is contrary to the present study.^{1, 4} One of the studies reported no significant change in diabetes control modification after vaccination in autoimmune diabetes using CGM system which is similar to our study.⁵

The study concludes that COVID-19 vaccination is safe and it does not show significant changes in the glycemic control in adolescents and young adults with T1D. If any elevations in glucose value observed they are temporary, mild and can be managed without any insulin dose adjustments. The side effects reported in T1D patients after COVID 19 were mild and similar to those reported in general population.

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Comparing the effects of propofol and ketamine on the emergence agitation following male circumcision

Post operative early agitation (EA) characterized by behavioral changes, screaming, crying, restlessness, irritability, convulsions, and disorientation during the recovery period after general anesthesia is a subject of many studies since 1960s.¹ There is an increased risk and increased incidence of EA in male gender, preschool age, higher preoperative anxiety level, and irregular breathing while sleeping at the onset of anesthesia.² The early post operative agitation is seen in the intravenous anesthetics. Ketamine is most commonly used outpatient anesthesia whose mechanism and effectiveness and its half-life is 2 h. Its side effects include confusion, tension, or delirium. When compared to Ketamine, Propofol has a shorter clearance of 1-1.5 h and it shows its hypnotic effect by activating GABA. ¹In this study, 0.1 mg/kg Midazolam was administered to the patients in the induction stage in order to reduce dissociative anesthesia effects. The complete or partial surgical removal of the foreskin of the penis is described as male circumcision. The agitation increases in the operations like circumcision in which bodily integrity is disturbed and the children feel punished. EA has been identified as an important problem in the post-esthetic care unit (PACU) This study is a comparison between the effect ketamine and propofol anesthesia on early agitation in children who underwent male circumcision.

**EA is observed with ketamine.
Propofol provides a safe anesthesia
compared to ketamine.**

It is a Retrospective study and included the 100 children who underwent circumcision between the age group of 3-10 years. The study subjects were classified in to two groups based on the anesthesia used i.e. Patients who were administered 0.1 mg/kg Midazolam and 2 mg/kg ketamine for the ketamine group (group K, $n = 50$) and patients who were administered 0.1 mg/kg midazolam and 2 mg/kg propofol for the propofol group (group P, $n = 50$). The study subjects were looked for spontaneous breathing and both the groups were provided with 2-4 L/min of oxygen through the nasal cannula. Dorsal penile block was applied to each patient with 0.3 ml/kg 0.25% bupivacaine after induction of anesthesia. The patients who cannot be immobilized and shows tachycardia and/or tachypnea as pain symptoms were controlled ventilation using sevoflurane inhalation anesthesia. In subjects who were provided sevoflurane, medical air in 50% oxygen and 1 MAC sevoflurane were used subsequently. Age, weight, and saturation values and ECG findings of all patients was noted. Pre-operative cough, straining, laryngospasm,

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bronchospasm, perioperative dysrhythmia, post-operative laryngospasm, bronchospasm, nausea, and vomiting was recorded. during anesthesia induction and operation. Aono's four-point scale score and Modified Steward scores were assessed from the anesthesia record paper. Aono's four-

Aono's four-point scale (AFPS)	Groups		<i>p</i>
	Propofol (<i>n</i> = 50) Mean ± SD	Ketamine (<i>n</i> = 50) Mean ± SD	
0 min	1.36 ± 0.52	1.32 ± 0.81	0.073
5 min	2.20 ± 0.53	3.08 ± 1.02	<0.001
10 min	2.06 ± 0.23	2.06 ± 0.23	1.000
Aono's four-point scale's (AFPS) comparison between propofol and ketamin groups at minutes 0, 5, and 10			

point scale score was 3 or higher is considered as emergence of agitation. The Modified Steward scores were used to discharge patients from the post-operative follow-up room to the ward. All statistical analysis was performed using IBM SPSS version 25.0 (SPSS Inc., Chicago, IL, USA). Continuous variables are presented as mean ± standard deviation. Categorical variables were presented as numbers and percentages. Mann-Whitney *U* test was used to compare variables.

	Groups	
	Propofol (<i>n</i> = 50) Mean ± SD	Ketamine (<i>n</i> = 50) Mean ± SD
Time spent to reach Modified Steward score ≥ 6	4.96 ± 2.77	10.44 ± 3.07
Time comparison (in minutes) to reach Modified Steward score ≥ 6 in propofol and ketamine groups		

There was no statistically significant difference was seen between the two groups in demographics such age, weight, and also the duration of anesthesia Aono's four-point scale scores were compared at minutes 0, 5, and 10 in propofol and ketamine groups. No statistically significant difference was noticed between propofol and ketamine groups in the Aono's four-point scale at minute 0 and 10th minute but in the 5th minute, it was higher in the ketamine group compared to the propofol group. With Aono's four-point scale, EA diagnosis is made in areas with 3 and 4 points. The average Aono's four-point scale in the ketamine group at the 5th minute was 3.08±1.02. A Modified Steward score of 6 and above was set as the prerequisite condition for discharge from the postoperative care unit to the ward. The time taken for Modified Steward score to reach 6 was found to be significantly higher in the ketamine group compared to the propofol group, with an average of 10.44±3.07.

In this study Aono's scores of EA were found higher in ketamine group compared to propofol group in the 5th minute which is statistically significant. Previous studies have examined the effects of sevoflurane on EA. The meta-analysis which includes 14 studies compared propofol and sevoflurane concluded that propofol anesthesia was shown to lower incidence of EA.³ similarly, in many studies; propofol has been reported to decrease or prevent EA caused by sevoflurane. Some other studies reported that prophylactic propofol is effective in reducing the incidence and severity of EA in children recovering from general anesthesia.⁴ In a study comparing intravenous ketamine in addition to inhalational anesthetics versus placebo for preventing EA in children, it was stated that it is difficult to claim that ketamine is a postoperative EA inhibitor.⁵ In another study conducted by Hesse et al., There is an interaction between anesthetic regimens that involve nitrous oxide or ketamine and the EEG trajectories most associated with PACU-D.⁶ Similarly, Costi et al. compared 3 mg/kg propofol and sevoflurane anesthesia using 218 MRI imaging. EA was higher in the group without propofol. In our study, it is seen that there was delay in the discharge from PACU to ward seen in ketamine group and also propofol is a safe drug with low side effect and provides rapid discharge to ward.⁷

The study concludes that EA does not only occur in inhalational anesthetics EA is also observed with ketamine. Solely, taking in consideration that it might cause EA in children, ketamine anesthesia alone should be avoided. Propofol provides a safe anesthesia compared to ketamine. Where the type of surgery is appropriate, anesthesia with propofol infusion should be considered instead of inhalational anesthesia.

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A fetus excised from the small intestinal of a neonate (Fetus in fetu): a case report

Fetus in fetu (FIF) is the most uncommon congenital abnormality. Its incidence is 1/500,000 births.^{1, 2} Since it is very rare the pediatric surgeons only experience this type of cases once or twice during their professional careers.³ Johann Friedrich first described FIF in early 90s, later willis defined it as a mass containing a vertebral axis, often with an appropriate arrangement of limbs or other organs around this axis. Gonzalez-Crussi confirmed this definition, describing FIF as “a highly organo-typic development with vertebral axis and mature circumferential tissue arrangement.”¹ The relationship between the teratoma and FIF is indistinct with no clear difference. Presence of vertebral column is the distinct feature in diagnosing FIF according to some writers. FIF may resemble fetus with the presence of organized vertebral, musculoskeletal, and organ structures. Presence of one of the following characteristics is important to consider an FIF: a mass enclosed within a distinct sac, partially or completely covered by skin, grossly recognizable anatomic features, and attached to the host by a pedicle containing a few relatively large blood vessels. karyotyping and DNA analysis proves that FIF tumors are often single, genetically identical and rarely multiple.¹

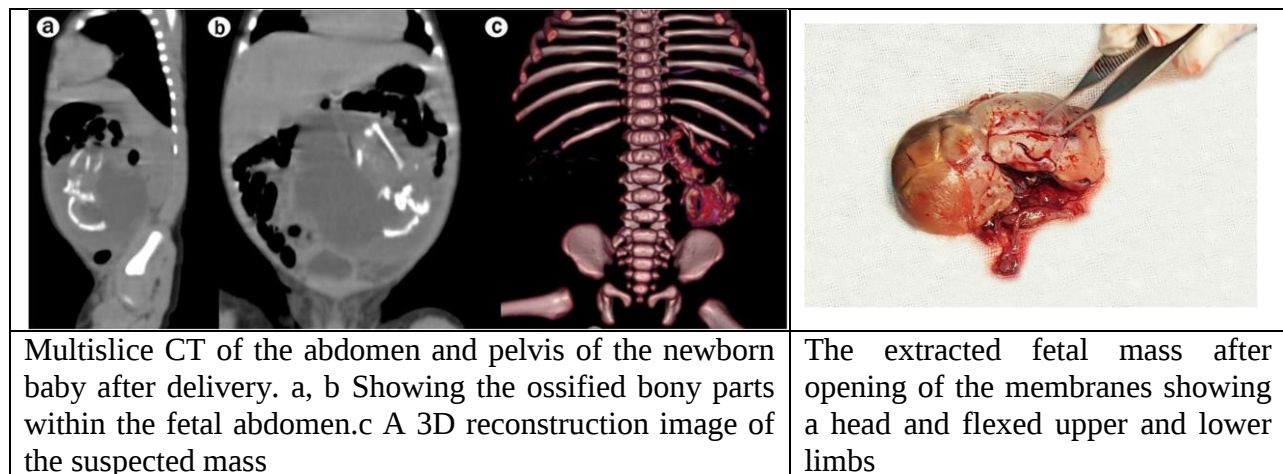
A 27 year old female during her follow up with a second pregnancy, an abnormal mass in fetal abdomen was suspected by gynecologist at the 6th month of pregnancy by a routine pregnancy ultrasonography. her first was 2 year old healthy with no congenital abnormalities. Polycystic mass on the left side of the baby's abdomen was observed in 4D-ultrasonography and complicated meconium ileus was suspected. Delivery was done by cesarean section at the full term. The inspection of fetus abdomen after the delivery revealed moderate

Even though Fetus in fetu is a rare, it must be kept in mind while dealing with a neonatal abdominal mass showing bony parts on radiography



The skull of the fetus bulging through the small intestinal mesentery of the delivered baby

abdominal distention, dilated veins over the anterior abdominal wall, and erythematous patches over the skin of the left lumbar region. Superficial palpation of the abdomen revealed partially solid-partially cystic mass occupying the whole left side of the abdomen and crossing midline. The was soon shifted to NICU. Rectal examination revealed regular meconium. Plain erect X-ray was done which revealed neither fluid levels nor pneumoperitoneum, so oral feeding was started and bowel movements were normal ruling out meconium ileus. Echocardiography was done which revealed a small ASD ostium secundum. total leucocytic count was $9.76 \times 10^3/\mu\text{L}$ with 33% neutrophils. Multi-slice CT of abdomen and pelvis was done for the baby after 24 h of delivery which presented a large retroperitoneal mass measuring $78 \times 67 \times 50$ mm with well-defined margins. It appeared hypodense with multilocular cystic areas, containing calcified structures in a configuration of fetal bones (skull, spines, femur, and pelvic bones). At 3 days baby was operated under general anesthesia. The mass was extracted and abdomen was explored for any other congenital anomalies The fetal mass extracted was sent for histopathological examination and examination of different sections illustrated the presence of vertebral bone trabeculae with bone marrow spaces, cartilaginous foci, covering skin with adnexa, islands of mucosa together with fetal membranes, and chorionic villi. There was no evidence of immature tissues or neoplastic transformation seen.



The fetus mass was present retroperitoneal in the mesentery of the small intestine presence of abdominal mass was the presenting complaint in 70% of the cases out of which 80% were predominantly retroperitoneal.⁴ However, FIF was also found in many other sites including oral cavity, sacrococcygeal region, Scrotum and even rarer localizations like intracranial FIF.^{1, 3} In this study the FIF was suspected during the pregnancy where as in other cases the FIF was revealed during infancy and very few reported during 2 years of age.³ CT scan was the most common diagnosis used in the study of 2019 conducted by Taher et al. which preoperatively

confirmed 4 FIF cases indicating presence of long bone structures and vertebrae.³ Even though FIF can be extracted easily in many cases the vascular supply complications can be seen during the dissection of vessels, the resection of FIF in this study was easy after opening peritoneum followed by blunt dissection of whole mass out of retroperitoneum. Most of the FIF cases which have aortic blood supply can be easily extracted but the adherence to the other tissues makes it complicated. Only one patient suffered biliary leak in previous studies. Complete excision of FIF is recommended with timely follow up by tumor markers such as AFP, β -hCG, carcinoembryonic antigen and abdominal ultrasound may be necessary in some cases with immature tissue components.³

The study concludes that, Even though Fetus in fetu is a rare congenital anomaly, it must be kept in mind when dealing with a neonatal abdominal mass showing bony parts on radiography

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