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## Some of Our Recent Activities

- Recent Test Releases
- Recent Publications from SRL
- Continuing Medical Education on SRL Global Knowledge Forum
Message from the Editor

At the stroke of New Year, with great joy and pride, we bring forth to you the thirteenth issue of Pulse.

For this issue of Pulse, the editorial team received an unprecedented number of clinical case reports and had a tough time reviewing and selecting the ones for publication. This shows the vibrancy and talent of our scientific staff and the fact that Pulse continues to be a platform for us to report novel and rare cases we encounter in our professional settings.

This issue’s In Focus article is a rare and unique case of extrarenal angiolipoleiomyoma of the uterus. Cases range from various sections, including rare cases of Myroides species causing endocarditis and fungal brain abscess from Microbiology; ALK positive extranodal anaplastic large cell lymphoma from Hematology; stiff person syndrome from Biochemistry; and numerous reports from Histopathology like the extremely rare case of advanced epithelioid malignant peripheral nerve sheath tumor, solid pseudopapillary neoplasm of pancreas, syringomatous adenoma of nipple, liposarcoma of tongue, and the incidental finding of ovarian hemangioma and cervical stromal melanosis.

Along with case reports, Pulse also encompasses some brain-twisters, R&D activities and Continued Medical Education programs.

We would like to thank all the contributing authors for providing such a rich diversity of medical case reports on a diverse range of topics. At the same time, the editorial board welcomes case reports, medical quizzes and puzzles, citations of research publication, CME details and pictures to be included in the next issue.

Hope you will find these reports interesting and useful in your professional practice. We look forward to your invaluable suggestions and feedback.

Happy Reading…
Dr. B. R. Das
In Focus

Rare Tumor of Uterus - Angiolipoleiomyoma and Its Comparison with Renal Angiomyolipoma

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Summary
Extrarenal angiomyolipomas (AML) have been reported at various anatomical sites, but are extremely rare in uterus. We describe a case of 62-year-old woman who presented with low abdominal pain and menometrorrhagia for last 2-3 months. Ultrasonography suggested a fibroid measuring upto 3 cm. Patient underwent total hysterectomy with bilateral adnexectomy. Histopathological and immunohistochemical examination showed features of rare benign uterine tumor- angiolipoleiomyoma.

Background
Angiolipoleiomyoma (ALLM) is a benign mesenchymal neoplasm that present with a variable admixture of adipose tissue, smooth muscle with a well expressed vascular component. They are typically found in the kidneys and its occurrence in a uterus is extremely rare. The reported incidence of angiolipoleiomyomas is 0.06% of all benign uterine tumors (2). Case is presented due to its rarity. On review of literature only 17 cases have been reported till date.

Case Presentation
• 62-year-old patient presented with low abdominal pain, menometrorrhagia for last 2-3 months.
• There was no significant medical, family and obstetric history.

Investigations and Treatment
• Biochemical and haematological examination was within normal limit.
• The ultrasonography revealed a fibroid measuring upto 3 cm.
• The patient underwent total abdominal hysterectomy with bilateral adnexectomy.
• Gross examination showed 3x2 cm, well circumscribed soft, yellowish, submucosal nodule in the fundus.
• Histopathological examination showed a benign tumor angiolipoleiomyoma composed of admixture of three tissue components: smooth muscle fibers, mature adipose tissue and multiple thick-walled vessels (fig.1). No mitoses or necrosis were seen.
• On IHC, Desmin was strongly positive in spindle cells (fig.2) whereas these cells were non immunoreactive to HMB-45 (fig.3).

Differential Diagnosis
Differentials considered were:
1. Lipoleiomyoma biphasic tumor comprising of spindle cells, adipose tissue component and lack prominent vascular component.
2. Uterine PEComa show spindle to epithelioid cell with predilection for perivascular arrangement and are immunoreactive for HMB-45, desmin and actin.

In our case tumor was triphasic with spindle cells immunoreactive to desmin and negative for HMB-45.

Discussion
ALLM was first reported by Sieinski in 1989 (1). Intrauterine ALLMs are extremely rare. A review of the literature reveals 17 cases of ALLMs have been reported till date (1). The clinical presentation of uterine ALLMs is variable, often similar to that of typical leiomyomas – menometrorrhagia, presence of pelvic mass, abdominal pain or even lack of symptoms. Age of presentation ranges from 20-62 years. Most ALLMs are located in the corpus uteri,
followed by the cervix and the lower uterine segment as subserosal or intramural growths. The tumor size ranges from 2 to 16 cm with a median of 8.4 cm. Usually, the tumors are well defined with a pseudocapsule and are either soft or firm, as a consequence of the amount of smooth muscle, adipose tissue, and vascular components. Cut surface of tumors show a gray, pink/tan, and variegated appearance. Necrosis and hemorrhage are very rare features similar to those of renal AML. In our case age was 62 years, tumor was present in uterine corpus and size of tumor was 3 cms.

Currently, there are no criteria about the percentages of the 3 components for the diagnosis of ALLM. The smooth muscle cells are present in both thin and thick fascicles coursing through adipose and connective tissue. In one case reported so far, the smooth muscle cells showed a focus of atypical smooth muscle cell proliferation with many pleomorphic giant cells with no mitoses or necrosis therefore, the authors called this as ALLM with focus of atypical or symplastic leiomyoma (2). Only one out of 17 cases reported showed immunoreactivity to HMB-45 (5). Renal AML is also a triphasic tumor and is associated with tuberous sclerosis - a hereditary autosomal dominant complex, presenting with multiple hamartomas in various internal organ (4). On IHC epithelioid cells of renal AML are usually arranged around blood vessels showing immunoreactive to HMB-45 and smooth muscle cells show scattered, weak desmin immunoreactivity (4). In contrast to renal AML the uterine ALLMs is not associated with tuberous sclerosis and is HMB-45 negative. Smooth muscle cells of uterine ALLMs show strong cytoplasmic positivity for smooth muscle actin and desmin.

Learning Points/ Take Home Messages
• Though benign and rare tumor should be considered in the differential diagnosis of leiomyoma and uterine PEComa.
• Combination of actin, desmin and HMB-45 is useful in differentiating the above entities.

References

Case Reports

Ovarian Hemangioma and Cervical Stromal Melanosis - Incidental Detections in a Routine Hysterectomy

Irneet Mundi, Ritu Pankaj, A. K. Banerjee
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Summary
We report two interesting incidental findings in a hysterectomy performed on a 59 year old. Total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) was performed for fibroid uterus. One of the ovaries showed an ovarian hemangioma which is a rare tumor at this site. The cervix showed foci of stromal melanosis.

Background
Incidental findings in histopathology specimens are always a treat to the pathologist’s eyes. Incidental detection of ovarian hemangioma and foci of cervical stromal melanosis in a routine hysterectomy specimen makes the present case interesting. Sometimes these may pose diagnostic challenge to the pathologists. Hence, it is important to be aware of these entities.
Case Presentation

- A 59 year old female underwent TAH-BSO for symptomatic uterine fibroid.
- The right ovary on gross examination measured 2.5x1x0.3 cm and showed a haemorrhagic area measuring 1x0.5x0.3 cm. The other ovary was unremarkable.
- An intramural fibroid was detected.
- On microscopic examination the right ovarian stroma showed a relatively circumscribed area with many dilated and congested blood vessels lined by flattened endothelial cells. No atypical features were noted and it was diagnosed as cavernous hemangioma (Figure 1).
- Another interesting finding detected incidentally was the presence of pigmented cells in the subepithelial stroma of the endocervix (Figure 2).
- The intramural leiomyoma was benign in nature. Section from endometrium showed atrophic changes.

Investigations

The routine blood investigations were unremarkable.

Differential Diagnosis

- The main difficulty is distinguishing a small hemangioma from proliferation of dilated hilar vessels. In order to be regarded as a true hemangioma, a mass of vascular channels, ranging from small to large size with minimal amount of stroma should form a reasonably circumscribed lesion distinct from remainder of the ovary. Medullary blood vessels may appear particularly numerous and closely packed in postmenopausal women and should not be mistaken for a hemangioma. One of the main characteristics of these vessels is that they may be calcified or have thickened wall with narrowed lumen due to medial deposition of hyaline, amyloid like material.
- Presence of red blood cells within the vascular lumen and absence of pale eosinophilic homogenous material helps distinguishing cavernous hemangioma from lymphangioma (1).
- Another differential diagnosis is ovarian teratoma with a large hemangiomatous component. These can be distinguished from hemangioma by extensive and careful sampling to detect other teratomatous components.
- Angiosarcomas usually show marked cytological atypia, pleomorphism, papillary endothelial tufting, increased mitosis and necrosis (2).
- Stromal melanosis should be distinguished from other pigmented lesions of the cervix. Melanosis of cervix reveals pigmented melanocytes in the basal layer of epithelium but do not involve the stroma (3).
- Stromal melanosis should be distinguished from melanoma in which there is stromal infiltration by malignant cells. Junctional change is usually present. This may be especially problematic in scanty endocervical curettings, cervical biopsy or cervical cone biopsy (4).

Treatment

Both the lesions were detected incidentally and did not require any further treatment.

Outcome and Followup

The hospital stay of the patient was uneventful and she recovered well after hysterectomy.

Discussion

Incidental findings always interest the pathologists. A number of lesions are picked up incidentally in hysterectomy specimens varying from benign lesions like adenomyosis and granulomas to premalignant and malignant conditions.

Ovarian hemangiomas are usually small and asymptomatic, being diagnosed usually incidentally. Vascular tumors of the female genital tract, especially those arising in the ovary are very rare. Some of them can attain large size and present clinically with pain due to torsion or abdominal distention due to the mass itself. Few cases have been reported to be associated with massive ascitis and elevated CA-125 mimicking ovarian carcinoma (5).

Although the etiology of the lesion remains unknown, they have been considered either hamartomatous malformations or true neoplasms in which pregnancy, other hormonal effects or infection have been implicated as growth enhancing factors (1).

The uterine cervix is normally devoid of melanocytes and hence melanin containing lesions are rare in this site. Foci of stromal melanocytes (FSM) have been
known as extra-cutaneous blue nevus. However macroscopic and histological findings suggest that FSM of cervix are analogous to dermal melanocytosis rather than to cutaneous blue nevus and lesions are more appropriately called stromal melanocytosis (6).

These lesions are rare and usually occur as an incidental finding in middle aged women. The most widely accepted theory is that they originate from melanoblasts that aberrantly migrate from the neural crest to the cervix during embryogenesis (4).

Learning Points/ Take Home Messages
Incidentally detected ovarian hemangioma and foci of cervical stromal melanosis are rare entities and may pose a diagnostic challenge. Hence, it is important to be aware of these conditions to avoid misinterpretation.

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Extremely Rare Case of Advanced Epithelioid Malignant Peripheral Nerve Sheath Tumour (Empnst) Presenting as Right Upper Arm Growth, Anterior Chest Wall Mass and Thyroid Nodule with Lung Metastasis in a 65 Year Old Female

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Summary
Malignant peripheral nerve sheath tumour (MPNST) is a rare malignant soft tissue tumour. It was also known over the years as malignant schwannoma, neurogenic sarcoma and neurofibrosarcoma. About half of these tumours arise de novo and other half from nerves involved by neurofibroma as a part of type 1 Recklinghausen disease. They represent approx. 10% of all soft tissue malignant tumours.

Epithelioid variants of MPNST are even rarer and are estimated to comprise 5% or fewer of MPNSTs. They have poorer prognosis and rarely involve the head and neck. They usually have predilection for lower extremities.

We present a case of 65 year old female who presented with a right upper arm papilloma like growth, anterior chest wall mass and thyroid nodular swelling for last 6 months. CT Scan of thorax showed a large soft tissue mass in the postero-superior mediastinum measuring 3.2x4.6x3 cms, causing compression of trachea and oesophagus. The mass appeared to extend into the trachea. Fat planes between it and right lobe of thyroid were lost, suggestive of infiltration. The mass was also indenting left lobe of thyroid and superior mediastinal vessels. Multiple small centrilobular nodules were seen in right middle and both lower lobes of lung, largest measuring approximately 1.2x0.9 cms.

A soft tissue mass with necrosis was seen in the right anterior chest wall, at the level of lower end of sternum, measuring approximately 4.7x3.7 cms. Fine Needle Aspiration Cytology (FNAC) of all three sites including right upper arm growth, anterior chest wall mass and thyroid nodule showed hypercellular smears composed of similar looking atypical cells arranged as singly dispersed, in papillary clusters and few groups suggestive of malignant neoplasm.
Biopsy from right upper arm growth showed a defined lesion composed of poorly differentiated cells in the form of sheets and nests of polygonal cells with epithelioid morphology having prominent nucleoli and eosinophilic cytoplasm. On IHC, tumour cells were positive for Vimentin, S-100, patchy weak for CK, negative for LCA, Desmin and HMB-45. Tumour cells were patchy weak for EMA, patchy membranous positive for CD99 and negative for CD68. Morphological and Immunohistochemical features are in favour of Epithelioid Malignant Peripheral Nerve Sheath tumour (EMPNST).

**Background**

- Epithelioid malignant peripheral nerve sheath tumour (EMPNST) is rare and differs from conventional malignant peripheral nerve sheath tumour by showing diffuse S-100 protein positivity, infrequent association with NF1, and occasional origin in a schwannoma.
- Loss of INI1 expression is seen in a subset of tumour

**Case Presentation**

A 65 year old female presented with a right upper arm papilloma like growth, anterior chest wall mass and thyroid nodular swelling for last 6 months. There are no symptoms of dysphagia, loss of appetite or fever.

**Lab Investigations**

Fine Needle Aspiration Cytology (FNAC) of all three sites including right upper arm growth, anterior chest wall mass and thyroid nodule showed hypercellular smears composed of similar looking atypical cells arranged as singly dispersed, in papillary clusters and few groups. The atypical cells showed moderate cytoplasm with central to eccentric nuclei, prominent nucleoli and moderate cytoplasm. Few mitotic figures and foci of necrosis were also seen. Features were suggestive of malignant neoplasm.

Histopathological and Immunohistochemical report - Biopsy from right upper arm growth showed a defined lesion composed of poorly differentiated cells in the form of sheets and nests of polygonal cells with epithelioid morphology having prominent nucleoli and eosinophilic cytoplasm.

On IHC, tumour cells were positive for Vimentin, S-100, patchy weak for CK, negative for LCA, Desmin and HMB-45. Tumour cells were patchy weak for EMA, patchy membranous positive for CD99 and negative for CD68.

Morphological and Immunohistochemical features are in favour of Epithelioid Malignant Peripheral Nerve Sheath tumour (EMPNST).

**Differential Diagnosis**

EMPNST may be confused with many epithelioid neoplasm’s including metastatic melanomas, metastatic carcinomas, large cell lymphoma, myoepithelial carcinomas, epithelioid schwannomas, and other soft tissue sarcomas with epithelioid features (epithelioid sarcoma, epithelioid angiosarcoma, clear cell sarcoma etc).

EMPNST might be very difficult to differentiate from amelanotic melanoma, but the presence of immunoreactivity for other melanoma markers such as tyrosinase, MelanA, and HMB-45 and the presence of a junctional component are useful in differentiating melanoma from epithelioid MPNST.

**Discussion**

Malignant peripheral nerve sheath tumour (MPNST) is a rare malignant soft tissue tumour. Its variants include rhabdomyoblastic (malignant “Triton tumour”), glandular, melanocytic and epithelioid MPNST [1]. Most MPNSTs are generally considered high-grade sarcomas [1]. Approximately 40% of patients developed local recurrence, and the overall five-year survival rate was 34–43% [6, 7].

On the other hand, epithelioid variants are rare and are estimated to comprise 5% or fewer of MPNSTs [1]. Thus, biologic behaviour and prognosis are unclear. However, the largest series, which included 26 cases and was reported by Laskin et al. [3], showed that although most patients were treated with wide excision, four developed distant metastases and three died of the disease within three years. High incidence of metastasis (seven of 14 cases) was also reported by Lodding et al. in 1986 [2].
The Epithelioid malignant peripheral nerve sheath tumour (EMPNST) is a rare sarcoma originating from the supportive non-neuronal components of peripheral nerves [8]. Epithelioid MPNST (EMPNST) is a morphologically distinct variant that most commonly affects adults on the lower extremity or trunk, although a wide age range and site distribution are seen.

In this variant morphologically, a part or most of the tumour is composed of plump cells with polygonal acidophilic cytoplasm and an epithelioid like appearance. MPNST EMPNST is rare and differs from conventional malignant peripheral nerve sheath tumour by showing diffuse S-100 protein positivity, infrequent association with NF1, and occasional origin in a schwannoma. Loss of INI1 expression is seen in a subset of tumours. In contrast with MPNST with spindle cell morphologic features, the epithelioid variant often displays more uniform S-100 protein staining [9].

Differential diagnosis of this variant includes malignant melanoma, metastatic carcinoma and epithelioid sarcoma. Immunohistochemistry helps in diagnosis. MPNST is positive for S-100, Leu 7, and myelin basic protein. Malignant melanoma is positive for S-100 and HMB 45 [10]. Metastatic carcinoma is positive for cytokeratin and epithelial membrane antigen (EMA). Epithelioid sarcoma shows positivity for cytokeratin, EMA, vimentin, and CD34.

MPNST is a very aggressive tumour which spreads via direct perineural invasion and the hematogenous route. The local recurrence rate is about 54% and the rate of distant metastases to lung and bone is about 65% [11]. Lymph nodal metastasis occurs in conjunction with widespread disease [12]. Prognosis of head and neck tumours are poorer compared to those of the extremities and the trunk, with five years survival rates from 15% to 35% [13].

Acknowledgment
The authors wish to express thanks to Dr. Seema Rana, Dr. Neeraj Prakash and Dr. Jasbir Singh, Consultant Histopathologists at SRL Reference lab, Gurgaon for their help rendered in IHC marker studies required for this case.

References

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A Case of Stiff Person Syndrome

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Summary
Stiff person syndrome (SPS) is a rare neurological condition with an intriguing pathophysiology and may result in severe functional disability. This was a case of a 49 year old male who presented with back pain since 3 years. He had progressively debilitating symptoms of leg stiffness and inability to walk without support. He had severe spastic paraparesis in all limbs. During stay in the hospital, he further developed severe paraspinal muscle spasm, severe spasm of abdominal muscles along with stiffness of lower limbs and gait ataxia.

Various investigations were done systematically to establish diagnosis and among this most notably the levels of Anti GAD antibodies which were high, finally helped to establish the diagnosis of stiff person syndrome. Treatment with IV Immunoglobulin and IV Baclofen improved his symptoms and he was discharged.

Stiff person syndrome (SPS) is a rare neurological condition with an intriguing pathophysiology and may result in severe functional disability. SPS is estimated to occur in 1 per 1 million individuals. SPS is currently viewed as an autoimmune disease and may be associated with other autoimmune conditions such as type 1 diabetes mellitus, Hashimoto’s thyroiditis, vitiligo, pernicious anemia, systemic lupus erythematosus (SLE) and coeliac disease.

SPS was first described in 1956 as a previously unknown neurological disorder characterized by ‘progressive fluctuating muscular rigidity and spasm’. In 1998, Solimena et al were the first to associate SPS with antibodies against the enzyme glutamic acid decarboxylase (GAD). The elevated levels of GAD help to clinch the diagnosis of Stiff person syndrome along with typical clinical features.

This case was selected as it is very rare. This syndrome is often mistaken for chronic backache and /or psychiatric illness. Early diagnosis and treatment helps to prevent long term disability. A high level of the biochemical marker, Anti GAD antibody, along with relevant diagnostic findings helps to confirm the diagnosis.

Case Presentation
A 49 year old male of African origin, presented with C/C of back pain since 3 years. Associated with stiffness of both lower limbs.
- Since 1 year he has been unable to walk without support.
- Walking with stiff legs unable to bend at knee joint. Had visited a few hospitals where he was treated for chronic backache.
- H/O sudden onset of SDH, underwent burr hole evacuation in 2013.
- No H/O pain in neck, weakness of limbs/bowel and bladder disturbances /fever/trauma

Past history
- Hypertension, Burr hole evacuation of SDH on left temporo parietal region.

Physical examination: No pallor/cyanosis/pedal edema
- Temp: 98.6 deg F Pulse: 80/min
- BP: 120/80 , RR :22/min
- CVS: S1 S2+ No murmur
- RS: NVBS,B/L air entry equal
- PA : soft , no tenderness, no organomegaly,BS+

On neurological examination:
- Conscious, alert, oriented, higher mental functions normal.
- Cranial nerves: normal.
- Straight leg rising test: bilateral negative
- Motor: no motor deficits, spasticity in all four limbs
- No cerebellar or meningeal signs
- Severe muscle spasm intermittent in abdominal muscles, likely from spinal myoclonus
- Spastic paraparesis with significant lumbar lordosis
- Progressive paraparesis with significant gait abnormality with no sensory signs and symptoms
- No bladder/bowel symptoms

Progressively, patient developed severe paraspinal muscle spasm, severe spasm of abdominal muscles along with stiffness of lower limbs and gait ataxia. He was sensitive to stimuli of sudden sounds.

Differential diagnosis: Spastic Paraparesis/ Stiff Person Syndrome

Investigations
- MRI Spine
- Serum B12, Serum Copper, TFT, Serum Calcium
- CSF analysis, Meningoencephalitis panel
- CSF routine
Investigation results:
- B12: 858 pg/ml (normal)
- Serum copper: 140 micro gm/dl (normal)
- CSF: Lymphocytes 100. No organisms, No AFB
- Glutamic acid decarboxylase IgG >500 U/ml
  - Negative: <30
  - Positive: >30
- ANA Profile Blot: U1 nRNP detected
- Needle EMG: continuous (low frequency) motor unit activity (CMUA) simultaneously occurring in agonist and antagonist muscles

Treatment
- IV Immunoglobulin
- Clonazepam
- Baclofen

Outcome/ Followup
Treatment continued with IV Immunoglobulin, stiffness improved symptomatically and spasticity decreased. Further stay in hospital uneventful.

Discussion
SPS is currently viewed as an autoimmune disease and may be associated with other autoimmune conditions such as type 1 diabetes mellitus, Hashimoto’s thyroiditis, vitiligo, pernicious anemia, systemic lupus erythematosus (SLE) and celiac disease. Epilepsy may be associated with SPS and is present in 10 - 20% of cases. More than 60% of patients diagnosed with SPS have at least one psychiatric diagnosis. In 1998, Solimena et al were the first to associate SPS with antibodies against the enzyme glutamic acid decarboxylase (GAD).

Glutamic acid decarboxylase (GAD) is a neuronal enzyme involved in the synthesis of the neurotransmitter gamma-aminobutyric acid (GABA). This enzyme catalyses the decarboxylation of L-glutamate into gamma-amino butyric acid (GABA). GABA functions in GABA-ergic neurons, which are the main inhibitory neurotransmitter in the brain and spinal cord. Auto-antibodies directed against GAD, lower the levels of GABA and raise levels of glutamic acid.

This relative GABA deficiency has been proposed as the basis for the pathophysiology of SPS.

GAD is also synthesized in non-neuronal tissues, including the beta cells of pancreatic islets, testes and oviducts. The enzyme has two isoforms, namely a membrane-associated 65 kDa form, GAD 65, and the soluble 67 kDa form, GAD67. These isoforms differ in structure and function. In cases of SPS, auto-antibodies directed against GAD 65 are present in the sera of up to 80% of patients. In 75% of patients, GAD 65 antibodies are present in the cerebrospinal fluid (CSF). Auto-antibodies to GAD67 are found in 50% or fewer of SPS patients, although at notably lower titres. The CSF titres are 50 times lower than in serum, although the rate of antibody synthesis is 10 times higher in CSF.

The lack of GABA results in cerebellar ataxia which is a hallmark of SPS.

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Extranodal Anaplastic Large Cell Lymphoma, ALK Positive

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Biopsy from a progressively increasing soft tissue swelling from right lower thigh of an 11 year old child revealed poorly differentiated tumour. Using stepwise panel of anti-body markers by immunohistochemistry, a diagnosis of Anaplastic Large cell Lymphoma (ALCL), ALK Positive was made. ALCL ALK+ accounts for 3% of adult Non-Hodgkin Lymphoma and 10-20% of childhood lymphomas. It is considered as a separate entity in 2008 WHO classification of hematolymphoid malignancies among Peripheral T cell neoplasms due to its favourable prognosis compared with ALCL, ALK- and recently developed ALK inhibitors for treatment.

Among mature T cell neoplasms, currently two types of systemic ALCL are described: ALK+ ALCL and ALK-ALCL, based on translocation involving anaplastic lymphoma kinase (ALK) gene on chromosome 2 and nucleophosmin (NPM) gene on chromosome 5 or a variant translocations. ALK protein expression identified by tissue IHC along with CD30 helps in diagnosis among wide morphological spectrum of ALCL.

Case Presentation
11 year old male patient presented with pain and swelling involving right side lower thigh for 6 months. Initially he was treated for suspected osteomyelitis. Later a Tru-Cut biopsy done elsewhere was reported as chronic non-specific inflammation and patient was put on ATT for 2 months. Since there was progressive increase in swelling patient was referred to our Hospital. Patient reported weight loss; however, there was no history of trauma. MRI of right femur showed large soft tissue lesion measuring 9 x 5 cm, involving lower thigh on right side. Also, underlying cortical irregularity in dia, meta and epiphysis of femur was noted. MRI findings were suggestive of a neoplastic etiology and biopsy was done under GA and sent for histopathology.

Investigations
Routine investigations CBC, LFT, KFT, PT and APTT were within normal limits. Culture from necrotic material from soft tissue and bone were sterile after 5 days and AFB was negative.

Histopathology of biopsy sections showed widespread infiltration by poorly differentiated tumour comprising large cells with oval to irregular kidney shaped nuclei, finely dispersed nuclear chromatin, inconspicuous to occasional small nucleoli and abundant cytoplasm. On Immunohistochemistry, tumour cells were positive for LCA, ALK, CD30, CD43, CD99, CD56 and BCL2 (patchy). Ki67 proliferation index was ~ 70%. Few CD68 positive singly scattered histiocytic cells were also observed. List of negative markers comprised T cell markers (CD2, CD3, CD4, CD8, CD5, CD7 & Tdt), B cell markers (CD20, CD79a, PAX-5) and CD15, CD30, EMA, Synaptophysin, CK & Chromogranin. Loss of pan T-cell antigens points to a null phenotype of ALCL ALK+; however, T/null ALCL ALK+ is considered a single entity as both show evidence of T cell lineage at genetic level. TCR gene rearrangement and ALK mutation analysis were recommended in this case.

Differential Diagnosis
ALK positive ALCL must be distinguished from primary cutaneous ALCL, ALCL ALK-, ALK positive diffuse large B cell lymphoma and some non- hematopoietic neoplasms such as rhabdomyosarcoma and inflammatory myofibroblastic tumours.

Treatment
Patient was planned for BFM 90 protocol for paediatric lymphoma.

Discussion
ALK+ ALCL shows a broad morphologic spectrum, but all cases contain a variable pro-proportion of cells with eccentric, horseshoe or kidney-shaped nuclei often with an eosinophilic region near the nucleus ("hallmark cells"). Various morphologic patterns can be recognised such as common, lymphohistiocytic, small cell, Hodgkin-like, signet ring cell patterns etc.
Composite patterns may also be seen in a single biopsy. Diagnosis is based on expression of CD30 and ALK protein by tissue IHC. Our case showed a classic large pleomorphic cell pattern and Null phenotype ALCL ALK+.

A review of literature highlights ALCL in pediatric age groups, which mimics non-lymphomatous tumors. In the report by Gustafson et al., a 6-year-old girl had ALK-positive ALCL that arose in soft tissue of the neck. In another report by Rekhi B et al two patients aged 9 and 16 years, respectively, who presented with soft tissue and axillary nodes and were differentially diagnosed as rhabdomyosarcoma and a lymphoma; however, IHC was conclusive in diagnosing ALCL. Pant et al, in their study of 12 cases, concluded that the pleomorphic cytology of ALCL leads to confusion with the bone and soft-tissue sarcoma.

High level of suspicion and systematic use of IHC markers are required to arrive at a diagnosis of this entity.

References

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Solid Pseudopapillary Neoplasm of Pancreas in a Male Child: A Rare Presentation

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Summary
A thirteen year old boy, previously in good health presented with vague pain in right hypochondrium and upper abdomen since two months. An ultrasound performed initially revealed a mass/cystic lesion in head of pancreas and CT scan was advised. CT scan showed an inhomogenous well circumscribed mass in head of pancreas measuring up to 5 cm. There were no enlarged abdominal lymph nodes. Patient underwent complete excision of tumor. Gross examination revealed a solid brown tumor. Histopathology and IHC features were of solid pseudopapillary neoplasm of pancreas.

Background
Solid pseudopapillary neoplasm, an uncommon tumor, usually involves tail/body of pancreas in young females (2nd to 4th decade). It is rare in males and in children. We present a case of Solid pseudopapillary neoplasm involving head of pancreas in a male child.

Case Presentation
Male child presented with pain in right upper abdomen. Past/medical/Social history was not contributory.

Investigations
• CT scan showed well circumscribed heterogenous mass in head of pancreas.
• Gross examination revealed a solid grey brown well circumscribed mass measuring up to 5 cm.
• Microscopic examination revealed a tumor composed of relatively monomorphic polygonal cells with granular eosinophilic cytoplasm, focally arranged around pseudopapillary fibrous cores. Nuclei showed subtle grooves and indentation. Nucleoli were inconspicuous. Mitotic figures were not seen. No necrosis/haemorrhage were seen.
• On IHC, tumor cells showed patchy positivity for PANCK and were negative for synaptophysin and chromogranin. Tumor cells were diffusely positive
for vimentin, CD 10 and Progesterone receptor. Ki 67 index was less than 1%. On the basis of above radiologic, histologic and IHC findings, patient was diagnosed with Solid pseudo papillary neoplasm of pancreas.

**Discussion**

Solid pseudopapillary neoplasm, an uncommon tumor with strong predilection for young females is rare in male children. Review of the literature revealed about twenty five cases of solid pseudopapillary neoplasm of pancreas in male children with an average age of presentation being 10.5 years (1, 2).

CT and MRI of this tumor reveal a well defined heterogeneous mass involving head/body/tail of pancreas (2). Careful nuclear features (nuclear groves and nuclear indentation) can aid in diagnosis where papillary architecture is not present (2). There are no significant differences between male and female patients regarding surgical strategies and prognosis (3).

**Learning Points/ Take Home Messages**

- Solid pseudopapillary neoplasm should always be considered in differential diagnosis of pancreatic tumours irrespective of age profile and sex of the patient.
- Careful examination of radiological findings, histological features along with IHC help us to arrive at a diagnosis.

**References**


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An Interesting Cause of Brain Abscess

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Summary
This is an interesting case report of a 53 year male a known diabetic, hypertensive and a case of chronic renal failure on haemodialysis who presented with headache, drowsiness and left hemiparesis. Patient underwent right frontal craniotomy and total excision of frontal lobe abscess along with lobectomy. Direct Gram stained preparation of pus and 10% Potassium hydroxide (KOH) preparation revealed pus cells, but no bacteria and presence of broad hyphal elements. The patient being a diabetic a provisional diagnosis of mucor mycosis was entertained. However no fungal growth was obtained in 48 hours of incubation. After 96 hours of incubation, the blood agar showed growth of colonies with an olive gray velvety appearance consistent with Cladophialophora bantiana. He was treated with Amphotericin B and Flucytosine and haemodialysis. Post operatively he made good recovery with improvement in sensorium and hemiplegia. On discharge, patient was conscious alert with minimal left sided weakness.

Background
Phaeohypomycosis is a less common cause of brain abscess and aetiological agent Cladophialophora bantiana was isolated in culture. Timely diagnosis helped in targeted antifungal therapy with the patient showing good response and neurological recovery. Case reports from India are very few.

Case Presentation
- This is an interesting case report of a 53 year male, a known diabetic, hypertensive and a case of chronic renal failure on haemodialysis who presented with complaints of headache, drowsiness and left hemiparesis of 3 days duration. There was no history of seizure or trauma.
- Physical examination revealed an extremely drowsy patient, opening eyes to repeated calling, obeying simple commands and left hemiplegia with 0/5 power. Radiological evaluation CT head done showed a ring enhancing mass in the right frontal region with severe diffuse oedema.
- Patient underwent right frontal craniotomy and total excision of frontal lobe abscess along with lobectomy under general anaesthesia. Care was taken not to open the ventricles.
- Direct Gram stained preparation of pus revealed pus cells, but no bacteria and presence of broad hyphal elements. The smear stained by Ziehl Neelsen method was also negative for acid fast bacilli. Pus for bacterial culture and sensitivity was sterile. 10% Potassium hydroxide (KOH) preparation of pus showed numerous broad hyphae with near right angle branching. The patient being a diabetic a provisional diagnosis of mucor mycosis was entertained.
- However no fungal growth was obtained in 48 hours of incubation. After 96 hours of incubation, the blood agar showed growth of colonies with an olive gray velvety appearance which on LCB mount showed dark walled septate hyphae with single celled oval conidia in long branched chains (Fig. 3). Hyphae were septate and darkly pigmented with many conidia attached to the sides and lying free. Conidia were one-celled, pale brown, smooth-walled, and ellipsoid in shape. The conidiophores showed an acropetous type of branching (Fig. 4). The isolate could be grown at 42°C and was also urease positive, features which differentiates C. bantiana from other morphologically similar saprophytic fungi.

Histopathological examination also showed a granulomatous inflammation along with numerous septate fungal hyphae compatible with Cladophialophora (Fig.5 and Fig.6). The fungal presence was confirmed by special stains (PAS) (Fig.7).
Phaeohyphomycosis is a term used to describe infections caused by dematiaceous fungi, i.e., fungi which contain melanin in their cell wall.[1] Cladophialophora bantiana has been implicated to cause brain abscess in immunocompromised patients including solid organ transplant recipients and those with congenital or acquired immunodeficiency.[2-6]

**Learning Points/ Take Home Messages**
- Timely reporting of the presence of dematiaceous fungus from such samples can serve as a useful adjunct to clinical management.
- Less common cause of brain abscess and should be considered as a differential diagnosis and should be identified.

**References**

**Investigations**
Radiological evaluation CT head done showed a ring enhancing mass in the right frontal region with severe diffuse oedema.

**Differential Diagnosis**
Mucormycosis

**Treatment**
He was treated with Amphotericin B (5mg/kg for 28 days) and Flucytosine (100mg per day for 6 weeks) and haemodialysis.

**Outcome and Followup**
Post operatively he made good recovery with improvement in sensorium and hemiplegia. On discharge, patient was conscious alert with minimal left sided weakness. Patient is on regular neurosurgical follow up with improvement in weakness.

**Discussion**
Phaeohyphomycosis is a term used to describe infections caused by dematiaceous fungi, i.e., fungi which contain melanin in their cell wall.[1] Cladophialophora bantiana has been implicated to cause brain abscess in immunocompromised patients including solid organ transplant recipients and those with congenital or acquired immunodeficiency.[2-6]

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Syringomatous Adenoma of Nipple

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Summary
Syringomatous adenoma of the nipple is a rare disease. We present a case of a 33 years old woman with Syringomatous adenoma of the nipple, in whom local excision of the tumour was performed. Histologically, the tumour consisted of tubules, ductules and epithelial cell strands and some of the proliferating ducts showed characteristic tear drop and comma shaped appearance. Careful monitoring to detect the local recurrence is considered necessary, because Syringomatous adenoma of the nipple, while benign, is a locally invasive tumor but does not metastasize.

Background
Syringomatous adenoma of the nipple is a very rare benign tumor that was first reported by Rosen in 1983 [1]. To the best of our knowledge, only 38 cases have been reported in the literature [2], [4]–[5], including 36 female and 2 male cases. The age of these patients ranged from 11 to 87 years, with a mean age at presentation of 46.1 years.

Case Presentation
A 33 years old lady presented with firmness of her right nipple for 1 year. On examination nipple was retracted and firm to hard. No other lesion was palpable. No regional lymph node involved. Cone biopsy of nipple was taken with deeper tissue and sent for histopathological examination.

Grossly we received two skin covered soft tissue pieces. Cut section of larger tissue piece was grayish white and show tiny cystic spaces.

On microscopy the lesion located mainly in nipple. The lining of keratinized stratified squamous epithelium notice with underlying fibrous stroma showing haphazard proliferation of small oval ductules and tubules composed of small basophilic cells and few bilayered epithelial tubular structures. Ducts are comma shaped at places. Many keratinizing squamous cysts and solid islands of cells also seen. No atypia or mitotic activity was seen.

Discussion
Syringomatous adenoma of the nipple is an extremely rare benign tumor. To the best of our knowledge, only 38 cases have been reported in the English literature [2], [4]–[5], including 36 female and 2 male cases. The age of these patients ranged from 11 to 87 years, with a mean age at presentation of 46.1 years.

Syringomatous adenoma of the nipple commonly manifest as solitary firm masses in the subareolar or nipple region of the unilateral breast, and may also occur within the breast parenchyma. They may be clinically asymptomatic, tender and painful on palpation, and/or present with itching and ulceration [6]. Nipple inversion or discharge is noted on occasion [3].

Syringomatous adenoma of the nipple is a rare tumor, and diagnosis can be difficult. Based on histological classification of mammary gland tumors, differential diagnosis include nipple adenomas and low-grade adenosquamous carcinomas. Nipple adenomas are papillary or solid adenomas developing within the nipple where proliferation of papillary epithelium is remarkable [1]. Low-grade adenosquamous carcinomas that derive from the salivary gland duct show an adenoma-like structure. Because they frequently develop in the large and small salivary glands, these carcinomas can be differentiated from their sites of origin [7].

Syringomatous adenoma of the nipple forms comma-shaped cell nests or small glandular cavities with single or multiple layers of small homogeneous epithelial cells in a background of dense stromal cells. It proliferates and can infiltrate tissue from the nipple to as far as the subareolar stroma. Some of them differentiate to squamous epithelium.

Based on morphological features, we diagnosed the tumor in this case as Syringomatous adenoma of the nipple. The tumors are likely to have originated from the eccrine sweat ducts remaining in the breast.

Learning Points/ Take Home Messages
- Syringomatous adenoma of the nipple is a rare benign but locally aggressive tumour; thus, caution is required. It should also be considered as one of the differential diagnosis when any nodule in nipple or retraction of nipple.

Fig 1a (4x), b (10x) Photomicrograph shows haphazard proliferation of small oval ductules and tubules composed of small basophilic cells. Coma shaped ducts at places. Keratinising squamous cyst also seen.
• Complete excision is necessary for the treatment of Syringomatous adenoma of the nipple in order to avoid recurrence of the tumor and confirmation of histologically negative margins.
• Clinicians and pathologists should be aware of the possibility of diagnosing this extremely rare tumor to avoid unnecessary mastectomy and axillary lymph node dissections.

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Myroides Species: A Rare Cause of Endocarditis

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Summary
We present a case 32 years old female, known case of rheumatic heart disease that underwent valve replacement around 17 years back. She was admitted with complaints of breathlessness since 3 days in emergency for evaluation. She underwent redo MVR. Intraoperatively vegetations were present on the mitral valve. Subsequently her blood culture grew Myroides spp. She responded well to treatment and discharged. Myroides spp are not part of human flora and are commonly found in soil and water. They are considered as low grade pathogens. Genera Myroides are members of the family Flavobacteriaceae and comprise of a group of yellow-pigmented, oxidase positive, non motile, non fermentative Gram negative bacilli. However now a days they have been identified as causative agents in urinary tract infections, pneumonia, meningitis, fasciitis and ventriculitis in immunocompromised patients and a few life-threatening infections have been reported in immunocompetent individuals also.

Background
Myroides spp previously known as Flavobacterium odoratum are rare source of human infections. Natural habitat includes soil, fresh and marine waters, foods and sewage treatment plants. This case is presented to show the increasing incidence of uncommon isolates causing endocarditis. Isolation of such organism is of clinical significance due to its high resistance to the commonly used antibiotics.

Case Presentation
• Patient is a 32 old female non diabetic, known case of rheumatic heart disease undergone mitral and aortic valve replacement about 17 years back. She presented with complaints of breathlessness on walking and lying position in emergency. She was investigated and found to have stuck valve.
• After proper investigation and work up she underwent mitral valve replacement Vegetations were present on the mitral valve.
• Post operatively patient was put on inotropic support.
• She developed high TLC, fever for which blood culture, Urine culture were send. Empirically she was put on Inj Meropenem and Inj teicoplanin. Her blood culture grew Myroides spp. Then targocid was discontinued and meropenem was continued for 21 days as per the sensitivity report. She responded well. Subsequent blood cultures were negative.
Investigation:
Routine investigation: Normal except high TLC count, Procalcitonin = 12.21.
Echocardiography: Stuck Mitral valve. Mean PG = 42 mm Hg. Good bolus across aortic valve. No clot, vegetation.
Blood Culture: 2 sets of blood culture were send. Positive signal came after 12 hours of aerobic incubation in BacTAlert system. Gram stain showed gram negative bacilli.
Macroscopic Features: On blood agar plate, colonies were round, non hemolytic yellow-pigmented about 1–2 mm in size. (Fig. 1), It gives characteristic fruity odour. No growth on MacConkey agar.
Identification of species: The organism was a catalase- and oxidase-positive. Further identification was done using VITEK 2 compact, BioMérieux; which identified it as Myroides sp. (Excellent Identification).
Antibiotic Susceptibility
Vitek 2compact does not gave the sensitivity. So antimicrobial susceptibility testing was done on Mueller–Hinton agar by the Kirby–Bauer disc diffusion method and interpreted following Clinical Laboratory Standards Institute standards (CLSI, 2014), using the zone diameters for Pseudomonas aeruginosa (as there are no established standards for Myroides spp).

Learning Points/ Take Home Messages
Myroides spp. infections are being increasingly reported in both immunocompromised and immunocompetent hosts. This case highlights the fact that a rare pathogen like Myroides spp. should be considered in differential diagnosis of endocarditis and clinicians must be aware of its pathogenic role.

References

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Liposarcoma of Tongue

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Summary
Liposarcoma as the commonest soft tissue malignancies but liposarcomas of the head and neck are rare, representing 5 - 6 % of all sarcomas in this region. Of the intraoral liposarcomas, the tongue represents the most common site. The subset of intraoral liposarcomas is also more interesting because they tend to have a better prognosis in this region (1). However accurate clinical and histopathologic diagnosis of this lesion is difficult. The majority of cases run a benign course but have a high propensity to recur (2). Clinically they usually present as painless polyloid masses in the tongue but can also be multinodular (3). Sometimes they can be underdiagnosed as benign lipomas or misdiagnosed because of low mitotic activity and relative paucity of atypical cells (3). Histologically most are well differentiated type and respond well to wide surgical excision (4). We present here a case of well differentiated liposarcoma of tongue because of a) its extreme rarity b) unusual clinical presentation. Our case presented as a lingual ulcer on the left lateral border and extensive literature review revealed just a single case of liposarcoma of tongue presenting as ulcer.

Background
Given the rarity of liposarcoma in oral mucosa, it is important to keep in mind this entity when dealing with growth in this region. Presentation as a chronic lingual ulcer also adds to the peculiarity of this case. Careful attention to histopathologic features whenever dealing with a lipomatous lesion can lead to correct diagnosis and prevent mis or under diagnosis.

Case Presentation
An eighty four year old female presented with an ulcerated mass on right lateral border of tongue of two years duration. The ulcerated mass was excised and sent to our lab for histopathology examination.

- Gross examination showed an irregular greyish yellow tissue piece with ulcer measuring 1.5x 1.1 x 0.8 cm. The tissue was firm in consistency.
- On light microscopic examination an ulcerated bed was seen with hyperplastic stratified squamous epithelium on either side of the ulcer. The ulcer bed was infiltrated by many neutrophils, lymphocytes and eosinophils. (Fig 1). Another striking feature was the presence of lobules of lipocytes which showed marked variation in size. Careful examination revealed skeletal muscle infiltration by the lipocytes (Fig 2). The lipocytes reached right up to the base and also extended into the lateral margins. A thorough search for lipoblastic cells yielded sparse presence of mostly late stage lipoblasts. These had hyperchromatic eccentrically placed nuclei in a large vacuolated cell (Fig 3). No necrosis or mitosis were seen. The stroma also showed broad bands of collagen and blood vessels, the walls of which harboured spindloid cells (Fig 4). Based upon the above findings a diagnosis of Atypical lipomatous tumour (ALT)/ well differentiated liposarcoma (WDLS) of tongue was made.

Discussion
Liposarcoma of the tongue is a tumour of adult and old age with no gender predilection. Mean age is sixty two years with a peak incidence in the 7th and 8th decades. Clinically it is an indolent lesion with a long history and presents usually as a polypoid or nodular mass measuring 3-4cm in average diameter (5). After extensive search of literature we came across only one case report in a twenty one years old male who presented as an ulcerated nodule on the tongue with telangiectasia and a firm consistency6. Our case too presented as an ulcerated mass and this could have been caused by mechanical trauma. The most common histopathologic type is that of ALT/ WDLS (75%). In the tongue they have often been categorised mostly as lipoma like Liposarcoma. However spindle cell type and sclerosing type may also be found. In our case too, typical lipoma like areas were seen, however on careful observation under high power (40x) the lipoblast cell was identified. Lipoblast once considered essential to diagnose liposarcoma may be very sparse or altogether absent, however thick bands of collagen and muscle veins harboring spindle cells can also help in arriving at
ALT/WDLS is usually well circumscribed but unencapsulated. Muscle infiltration can mimic an intramuscle lipoma, which can lead to potential underdiagnosis. Immunohistochemistry is not of much use in the diagnosis of ALT/WDLS. Lipoblasts are S-100 positive, but as they are very sparse in ATL/WDLS variant, the use of IHC gets limited. Wide excision with clear margin is the treatment of choice for tongue liposarcoma. Tumor negative margins are associated with long disease free survival.

When a lipomatous lesion is encountered in the tongue, Liposarcoma should certainly be considered as a possible diagnosis. WD LS can be easily misdiagnosed as a benign lipoma. Though a malignant tumour, achieving clear tumour negative margins renders a favourable prognosis to the patient.

**References**

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**Brain Teasers**

**1. Diagnose the Following**
Bone marrow aspirate of a 12 yr old child (resident of Bihar); presenting with PUO, anaemia and huge hepatosplenomegaly. *Contributed by: Dr. Arpita Roy Dam, Clinical Reference Laboratory, SRL Ltd, Gurgaon, Haryana*

**2. Diagnose the Following**
49 year old female, 6 months post liver transplant for HCV Cirrhosis, now presenting with cholestasis. *Contributed by: Dr Nalini Bansal and Dr Shaloo Kapoor SRL Ltd, Fortis Hospital, Okhla, New Delhi*

**3. Identify the organism and specific feature shown in the pic**
A 65 yr female presented with B/L nasal sinusitis and necrotic material in middle turbinates. *Contributed by: SRL Lab Team, Fortis Shalimar Bagh, New Delhi*
4. Diagnose the Following
45 yrs/ F, Gyane Pap smear. **Contributed by: Dr. Neeraj Garg, SRL Limited, Fortis Memorial Research Institute, Gurgaon, Haryana**

**Answer for Last Issues Brain Teaser**
Identify the disease (Issue 12, June 2015) - Nevus comedonicus

**SRL Activities**

**Recent Test Releases**

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| Next Generation Sequencing Based Hereditary Cancer Panels: HCP-Next and HCP Expanded | Oncology                  | 1. Hereditary Cancer Panel Next targets 32 genes related to 7 major cancer types along with 21 associated syndromes.  
2. Hereditary Cancer Panel Expanded targets 48 genes related to 10 cancer types along with 29 associated syndromes. |
| Fibrometer – NAFLD & Fibrometer ALD                                             | Gastroenterology          | Fibrometer NAFLD combines nine variables (age, weight, fasting glucose, AST, ALT, Ferritin, Platelet count, Prothrombin time and Hyaluronic acid). FibroMeter ALD combines six variables (Age, Gender, Alpha-2-macroglobulin, Hyaluronic Acid, Prothrombin index and Platelets). |
| Phospholipase A2 receptors (PLA2R) Antibodies                                   | Autoimmune Disorders      | Used to differentiate between anti-PLA2R positive and idiopathic cases. Predicts disease outcome, therapy requirements and the risk of recurrence after kidney transplantation. |
| PAX-5                                                                           | Oncology                  | Aids in diagnosis of undifferentiated lymphoid neoplasms.                                      |
| DMD – PNDT                                                                     | Genetic Disorders          | Prenatal diagnosis of DMD.                                                                     |
| Adenovirus Quantitative DNA PCR                                                 | Infectious Diseases       | Detects adenovirus in immunocompromised patients.                                               |
| EBV Quantitative DNA PCR                                                        | Infectious Diseases       | Used to investigate primary or reactivated EBV infection in immunocompromised patients.          |
| IFOBT (immunochemical-based fecal occult blood testing)                         | Oncology                  | Detects CRC in asymptomatic population; CRC screening in average-risk adults (>50 yrs).         |
| Red Kidney Beans Allergen                                                       | Allergy                   | Detects allergic reactions to red kidney beans.                                                 |
| Papaya Allergen                                                                | Allergy                   | Detects allergic reactions to red kidney beans.                                                 |
| Pumpkin Allergen                                                              | Allergy                   | Detects allergic reactions to red kidney beans.                                                 |
| Myotonic Dystrophy Type 1 (DM1)                                                | Genetic Disorders          | Confirmation of DM1                                                                             |

**Recent Publications**

Continuing Medical Education on SRL Global Knowledge Forum


The CME seminars covered various medical disciplines e.g. gastroenterology, metabolic disorders, hormonal disorders, hematology, neonatology, infectious diseases, genetic disorders, autoimmunity and allergy, oncology, cardiology, gynecology, neurology, nephrology etc.

Here are some of the notable programmes we organized:

- **CME on ‘Preanalytical errors in Diagnostics’**
  Date: July 01, 2015
  Venue: IMA Institute, Bhubaneswar

- **CME on ‘Tuberculosis in Bone and Joint’**
  Date: August 13 & 19, 2015
  Venue: Assam Medical College, Dibrugarh

- **CME on ‘Ethical Practices in Pathology’**
  Date: September 08, 2015
  Venue: Sisir Mancha, Kolkata

- **CME on ‘Blood Based Biomarkers in NAFLD Diagnostics’**
  Date: September 21, 2015
  Venue: GB Pant Hospital, Delhi

- **CME on ‘Newborn Screening’**
  Date: November 16, 2015
  Venue: BG Road, Bangalore

- **CME on ‘Recent Advances in Tuberculosis Diagnosis’**
  Date: July 04, 2015
  Venue: Agra

- **CME on ‘Diagnosis of Allergy in Children’**
  Date: August 22, 2015
  Venue: Fortis Hospital, Bangalore

- **CME on ‘Recent Advances in Cervical Cancer Screening and Infertility’**
  Date: September 12, 2015
  Venue: NMCH, EMOC Hall, Patna

- **CME on ‘Advancement of Diagnosis in GIT Ailments’**
  Date: October 03, 2015
  Venue: SGPGI, Lucknow

- **CME on ‘Breast Cancer - BRCA1/2 Genetic Testing on NGS’**
  Date: November 24, 2015
  Venue: Nagpur

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