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Interventional Radiology (IR) has revolutionized the treatment paradigm by improving diagnosis of many disease processes and implementation of it in patient treatment. Role of IR is divided into aiding histological diagnosis and symptomatic and definitive treatment of the tumour. Needle core biopsies and fine needle aspirations are used to provide optimal diagnosis of pathology with highest level of safety. More recently, definitive treatment procedures have also been evolved using image guided interventions.

Introduction
Multidisciplinary approach is key for successful treatment of cancer. IR has emerged as one of the main pillars for cancer treatment. Over past few decades there is tremendous development in field of radiology. Improvements in the machine hardware and new software have expanded the scope of interventional radiology. Development of time resolved imaging, new contrast agents and newer algorithms has strengthened evolution of IR in management of malignancy itself and complications arising from it. Advancements in hardware of Digital Subtraction Angiographic and embolization agents have improved the success rates of angiographic procedures and subsequent interventions.

Here we represent an overview of role of IR in management of cancer patients. IR is useful in form of 1) Diagnosis of cancer, 2) Definitive treatment of cancer and 3) Management of complications arising due to cancer (Palliative treatment).

1. Diagnosis of cancer by Interventional Radiology
Conventionally biopsy was being performed using laparotomy or laparoscopy which involves costs of hospitalization and risks of anaesthesia. Image guided biopsies have almost replaced the tradition of open biopsy and blind biopsy done for palpable tumours. Under image guidance lesion localisation, accessibility and suitability of path for biopsy can be easily detected. Major vessels can be easily identified and avoided, thus reducing complications. Both ultrasound and CT can be used for image guided biopsy. (Figures 1,2) Ultrasound guidance has advantage that it allows real time visualisation of needle and reduces the risk of ionising radiation hazard to patient. For intrathoracic and pelvic lesions as well as bone lesions tissue sampling can be performed under CT guidance which are difficult to perform under ultrasound guidance. However, there is disadvantage of exposure to ionising radiation to patient. MRI guided biopsies are performed at few centres. The technique is particularly used for breast and prostate lesions which are not apparent on ultrasound or CT. This technique requires special MRI compatible interventional suite, open magnet MRI scanner hence it is very costly at present. However in future it can gain acceptance on a wider stage.

Recent development of availability of fusion software allows real time ultrasound guided procedure to be fused upon pre-existing CT or MRI images improving accuracy with reduction in radiation exposure. Moreover PET-MRI and PET-CT fusion images can guide biopsy from high uptake lesion and thus improving the diagnostic accuracy.

Histological analysis and cytological analysis can be performed using needle core biopsy (NCB) and fine needle aspiration (FNA) respectively. The accuracy of core needle biopsy has been superior to fine needle aspiration in number of studies. Moreover it is possible
to differentiate in situ and invasive lesions. The material is obtained in core needle biopsy is far abundant than FNA hence apart from histological and cytological analysis, immunohistochemical analysis and molecular analysis can also be performed.

Pre-operative tumour localisation can be performed under image guidance when surgical biopsy is the preferred diagnostic approach. Stereotactic biopsy of intra-axial brain lesions is essential when knowledge of underlying pathology is required to guide further decisions regarding therapy. Neuroimaging alone cannot be used to predict histological diagnosis of intra-axial mass lesions therefore stereotactic biopsy is reliable tool to establish diagnosis.

2. Treatment of cancer by Intervention Radiology

2.1. Central venous catheter (CVC) insertion

Cancer patients require long term vascular access for providing medication, chemotherapy and parenteral nutrition without need of repeated venepuncture. Central venous catheter are usually placed by anaesthetist and surgeons, however recently there is an upsurge of IR techniques being used for this purpose.2 Real time imaging using ultrasound or fluoroscopy for guidance of advancing central catheter has advantage over blind technique guided by external landmarks in reducing intra and post procedure complications. Cancer patients are more prone for developing thrombosis and CVC placement further increases that risk.3 Thrombotic prophylaxis has not shown to reduce incidence of thrombosis in patients with CVCs, so anticoagulation prophylaxis is not recommended.4 In thrombosed vein, placement of tunnelled central venous catheter is usually preferred by IR. The occluded veins can be recanalised and the tunnelled central venous catheters can be inserted.5

2.2. Transcatheter arterial embolization (TACE)

Hepatic malignancies can be primary as well as metastatic. They are diagnosed at advanced stage and surgical resection is not curative in such cases. Intravenous chemotherapy has varied success rates with risk of systemic toxicity. Chemoembolization is performed by delivering a high dose of chemotherapeutic agents directly to the liver, hence increasing the dose of drug delivery to the tumour and decreasing the systemic toxicity. A mixture of chemotherapeutic drugs (doxorubicin, mitomycin-C, cisplatin) emulsified with lipiodol, followed by embolization with polyvinyl alcohol particles and gelfoam. TACE is widely used in treatment of malignant liver lesions, primary as well as metastatic.6 Success of TACE is based on the fact that liver tumour derives its blood supply mainly from hepatic artery, while normal liver tissue derives its supply from portal vein. Absence of arterial phase enhancement and tumour is fully covered with lipiodolis considered complete response. Various studies have shown improved survival rates in patients treated with TACE.

Newer therapies such as radioembolization with yttrium60 can be used to treat patient with unresectable liver tumours. It is a newer form of brachytherapy which allows introduction of beta radiation emitting radioisotopes directly into tumour tissue.7 Beta radiation has approximately 2.5 mm penetration power in human tissues so the necrosing effects are localised.8 Embolisation of vessels to control acute bleed:

Any bleed from tumour or metastasis into GI tract can be lethal sometimes. Post chemotherapy and radiotherapy some patients may develop GI bleed. In all such cases selective catheterisation of the vessels and embolization can be life saving for these patients. Similarly cases of massive hemoptysis can be controlled by embolization of the vessel.

2.3. Ablative techniques

Tissue ablative techniques have evolved over last few decades are used in a number of cancer patients. They include- Laser Ablation, radiofrequency ablation (Figure 3) and Cryoablation. MR guided laser induced thermotherapy(LITT) is used for hepatic metastasis less than 5 cm in size. It is an out patient procedure and initial studies have shown increased survival rates.9 Radiofrequency ablation delivers RF energy to the tumour causing tissue vaporization and cavitation of necrotic lesions can be done by using radiofrequency energy. When early and small HCCs are detected by screening program, RF ablation has shown promising results over surgical resection. For tumours < 3cm RF ablation causes complete necrosis in 90% cases as compared to 80% cases caused by percutaneous ethanol injection.10 For larger tumours, it is comparable to PEI with lesser complications.11 The alternating current results in ion agitation in tissue surrounding the needle. Agitation is converted into heat by friction. Once cytotoxic temperature is achieved, intracellular proteins are denatured, lipid bilayers melt and tumour cells undergo coagulation necrosis. Radiofrequency ablation can also treat benign bone tumours to relieve pain and prevent tumour growth.12 Radiofrequency ablation is used as an alternative to surgical treatment of osteoid osteoma. Traditionally surgery was considered treatment of choice for osteoid osteoma but with reported success rates approaching 90%, radiofrequency ablation should be considered among primary treatment options.

Cryoablation can also be used for treatment of metastatic tumours. It causes irreversible damage to tissue by applying extremely low temperature (subzero).13 Low temperature are intrinsically analgesic hence apart from local anaesthesia required for probe insertion, no analgesic drugs are required. The frozen tissue will show no signal on MRI, hence can be easily delineated.14

2.4 Percutaneous Ethanol Injection

Percutaneous ethanol injection is used as chemical ablative methods for the treatment of tumours. Liver tumours can be treated by PEI. For medium and large size tumours, efficacy of ethanol ablation is equivalent to RF ablation.15 Patients with hyperparathyroidism due to nodular hyperplasia which
are refractory to medical therapy are selectively managed by PEI. This is done under ultrasound guidance.

3. Management of complications of cancer by Interventional Radiology

Malignancy can cause number of complications which are debilitating. IR has provided many minimally invasive techniques to relieve pain and providing symptomatic relief to patient. Hence role of IR in palliative care is increasing.

3.1. Percutaneous transhepatic biliary drainage (PBD)

PBD has become readily available in most hospital settings and has revolutionized the treatment of patients with biliary obstruction (Figure 4). Malignant biliary obstruction has underlying pancreatic neoplasm extrinsically compressing the distal bile duct or hepatic hilar nodes. These cause obstruction of bile flow and results in proximal dilatation of biliary tree which may require percutaneous intervention. PBD is performed using fluoroscopic guidance. Ultrasound can be used in initial puncture when the bile ducts are dilated. Placement of catheter or stent is done for internal or external drainage of the bile. The advantage of a self-expanding metallic stent is ability to re-establish patency of occluded ducts. PBD can be associated with major complications such as sepsis, haemorrhage and inflammatory processes like abscess, peritonitis and pancreatitis. Rate of complications is higher in oncology patients which is related to advanced malignancy and presence of immunosuppression. Incidence of cholangitis in oncology patients undergoing PBD is approximately 50%. So prior to initiating PBD, all patients should be provided adequate antibiotic prophylaxis.

3.2. Percutaneous nephrostomy

Malignant ureteral obstruction can be induced by urologic, gynaecologic or gastrointestinal malignancies. It can be due to direct involvement by tumour, retroperitoneal lymphadenopathy or by extrinsic tumour compression. For urinary decompression, percutaneous nephrostomy (PCN) is often required. PCN is the most common intervention performed by IR. Indications for percutaneous nephrostomy include pyonephrosis, deteriorating renal function or urinary tract sepsis. Imaging guidance is provided by ultrasound or fluoroscopy. Bleeding complications can be minimized by entering the kidney in a relatively avascular zone created by branching of renal artery. Transient haematuria occurs in almost every patient but severe bleeding is uncommon. In malignant ureteral obstruction, decompression can be achieved in 95% of patients by initial PCN or ureteral stenting.
3.3. Pleural space intervention

Malignant pleural effusions are common complications in oncology patients due to involvement of pleura which results in patient morbidity presenting as dyspnoea, cough and chest pain. Ultrasound guided aspiration of pleural effusion can be done which may be also useful for cytological evaluation to detect malignant cells which aids into staging of known disease. For continuous drainage of recollecting pleural effusion, placement of catheter in pleural cavity may be necessary which can be done under image guidance of ultrasound or fluoroscopy.

3.4. Pain management

Pain causes significant amount of morbidity in advanced cases of cancer. Pain can be managed by opiates in 80-90 % of cancer patients. Patients in which pain is not controlled by opiates, may benefit from interventional pain management. IR is assuming an important role in management of cancer associated pain. Upper abdominal visceral cancer causes neuropathic pain which is poorly responsive to analgesic therapy. In these patients palliation of pain is achieved by celiac ganglion neurolysis and nerve block (Figure 5). Agents which are used include injection of local alcohol and phenol which causes permanent nerve root destruction. Celiac axis block is done under guidance of CT with either anterior or posterior approach. Percutaneous vertebral augmentation techniques include vertebroplasty, kyphoplasty, osteoplasty and sacroplasty. The principle of pain relief with vertebroplasty or kyphoplasty is based on consolidation of weakened and pathologic cancellous bone by injection of radio-opaque cement under image guidance and restoration of vertebral height. Polymethylmethacrylate(PMMA) is the most widely used cement.

3.5. Pyometra drainage

Pyometra is a gynaecological emergency in cervical cancer patients receiving radiotherapy because it can be complicated by perforation, sepsis and death. It can also delay in treatment initiation and continuation. For patients who may not be able to undergo drainage of the lesion under anaesthesia via cervical dilatation and drainage, ultrasound guided percutaneous drainage is a preferred alternative. (Figure 6) It is an effective means of evacuating the uterus when the patients are not able to undergo cervical dilatation because their genital anatomy is distorted whereby surgery may pose greater risk.

3.6 Post operative Lymphocele drainage

Lymphocele is abnormal collection of lymphatic fluid which may develop post operatively or secondary to tumours. Image guided techniques like aspiration, aspiration and catheter drainage, drainage and sclerotherapy are now more commonly used over...
surgical techniques like marsupialisation. Sclerotherapy is more effective than other methods. 26

3.7 Percutaneous enteral access

Percutaneous access to stomach and jejunum is done under image guidance is done for enteral feeding in cases of Upper GI tract malignancies. Percutaneous gastrostomy and gastrojenunostomy under fluoroscopic guidance has a success rate of 95% with fewer complications rates (5%). 27

References

MicroRNAs (miRNAs) are 21-23 nucleotide-long non-coding RNA molecules, which inhibit protein expression by binding to near-complementary sites in the 3’ untranslated region of target mRNAs. MiRNAs have recently gained significance as key cell-type specific regulators of cell signaling that function by targeting specific mediators/effectors of several cellular pathways. Many miRNAs are found to be deregulated in cancers and thus it becomes important to understand the balance that exists between the miRNA-target pair and this understanding may lead to development of potent cancer therapy approaches. A single microRNA can target multiple mRNAs, resulting in widespread changes in protein levels, both as a result of direct repression and due to secondary repression of downstream signaling pathways. By virtue of having multiple targets, an miRNA can have variable effects on oncogenesis by acting as tumor suppressor or oncogene in a context-dependent manner. Therefore, one of the goals of the preclinical research is to fully clarify this aspect before any clinical application can even be taken into consideration. We have shown that miR-155 is up-regulated in a majority of tongue cancer samples and a cell line. We found that miR-155 expression from BIC gene is predominantly controlled by AP-1 and NF-κB dependent transcription factors. By using various approaches, Pdcd4 was predicted to be a target for miR-155 and Pdcd4 is least expressed in tongue cancer samples and SAS tongue cancer cells. Given that Pdcd4 is a potent inhibitor of AP-1 dependent transcription, these results may provide a rational explanation to over expression of miR-155 and prompted us to study this further. Our invitro study with luciferase reporter containing 3’UTR of Pdcd4 shows that miR-155 reduced the luciferase activity compared to that containing 3’UTR mutated at miR-155 seed region in FBM, SCC131 and SAS cells. The ectopic expression of miR-155 in FBM and SCC131 cells results in reduced Pdcd4 protein levels, whereas knockdown of miR-155 in SAS cells by miR-sponges restores the levels of Pdcd4. We also show that the decrease in Pdcd4 protein by miR-155 increased the activation of AP-1-mediated transcription eventually activating the promoter of the BIC gene expressing miR-155, thus unravelling a positive feedback loop for the sustained expression of miR-155. Lentiviruses expressing miR-155 spongein SAS cells, knocked down miR-155 and increased Pdcd4 expression, decreased cell viability, increased apoptosis, and a marked regression of xenografts in nude mice. The knockdown of miR-155 also decreased colony formation in soft agar and clonogenic assays. Our data suggest that strategies to inhibit miR-155 expression or breaking miR-155-Pdcd4-AP-1 feedback loop provide novel opportunities in tongue cancer therapeutics.
Brief history of antibiotics and antibiotic resistance

“Magic bullet” or “Chemotherapeutic”, or “Chemical knife” words were coined for antibiotics and they were miraculous in treating the patients. Right from 1887 when Louis Pasteur observed inhibition of Anthrax bacillus by some other bacteria to the discovery of the first commercially available antibacterial known as Prontosil, a sulfonamide developed by the German biochemist named Gerhard Domagk in the 1930s when there was limitation to treat infections. Before this, in 1928, though Alexander Fleming had discovered the first antibiotic, penicillin, it took over a decade before penicillin was introduced as a treatment for bacterial infections. This was possible through the work of Florey and Chain who managed to efficiently purify the antibiotic and scale-up production. The introduction of penicillin marked the beginning of the so-called “golden era” of antibiotics. Between 1940 and 1962, most of the antibiotic classes we use as medicines today were discovered and introduced to the market. Each class typically contains several antibiotics that have been discovered over time or are modified versions of previous types. There are for e.g. numerous β-lactams (pronounced beta-lactams) such as different penicillin’s and cephalosporin’s. (Table 1,2)

Antibiotics have always been considered one of the wonder discoveries of the 20th century. This is true, but the real wonder is the rise of antibiotic resistance in hospitals, communities, and the environment concomitant with their use. The extraordinary genetic capacities of microbes have benefitted from man’s overuse of antibiotics to exploit every source of resistance genes and every means of horizontal gene transmission to develop multiple mechanisms of resistance for each and every antibiotic introduced into practice clinically, agriculturally, or otherwise. Though antibiotics have revolutionized medicine in many respects, and countless lives have been saved; their discovery was a turning point in human history; regrettably, the use of these wonder drugs has been accompanied by the rapid appearance of resistant strains. Medical experts are now warning of a return to the pre-antibiotic era; a recent database lists the existence of more than 20,000 potential resistance genes (r genes) of nearly 400 different types, predicted in the main from available bacterial genome sequences. (Table 3)

The prediction of Alexander Fleming has come true when he had declared that “It is not difficult to make microbes Resistant to Penicillin’s in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body” and the greatest possibility of evil in self-medication is the use of “Too Small Doses” (mis-use) so that instead of clearing up infection, the microbes are “Educated” to resist penicillin which can be passed to other individuals and from them to other, until they reach someone who gets a septicemia or a pneumonia which penicillin cannot save.

### Table 1: Development of resistance to old / newly introduced antimicrobial

<table>
<thead>
<tr>
<th>Agent</th>
<th>Year of FDA Approval</th>
<th>First reported resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>1940</td>
<td>1943</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>1947</td>
<td>1947</td>
</tr>
<tr>
<td>Tetracycllin</td>
<td>1952</td>
<td>1956</td>
</tr>
<tr>
<td>Methicillin</td>
<td>1960</td>
<td>1961</td>
</tr>
<tr>
<td>Nalidixic acid</td>
<td>1964</td>
<td>1966</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>1967</td>
<td>1969</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>1972</td>
<td>1987</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>1981</td>
<td>1981 (ampC-β-lactamase)</td>
</tr>
<tr>
<td>Linezolid</td>
<td>1999</td>
<td>2000</td>
</tr>
</tbody>
</table>
Gram Positive Cocci: Staphylococcus aureus produce enzyme Beta lactamases and acted on beta lactam ring of Penicillin and other beta lactam antibiotics causing the opening of the ring or structure of the beta lactam antibiotics making them inactive towards them, thus becoming notorious for its ability to become resistant to antibiotics. Infections caused by antibiotic-resistant strains often occur in epidemic waves initiated by one or a few successful clones of S.aureus. Methicillin-resistant S. aureus (MRSA) is prominently featured during these epidemics (10-15% in India). Historically associated with hospitals and other healthcare settings, MRSA now has emerged as a widespread cause of community infections. So-called community or community-associated MRSA spreads rapidly among healthy individuals. Outbreaks of community MRSA infections have also been reported worldwide and they are now epidemic globally. There is reason for concern because MRSA often are or can readily become resistant to multiple antibiotics, thus limiting treatment options.

A timeline (Figure1) of four waves of antibiotic resistance in S.aureus has been see. Wave-1: which even continues today, began shortly after the introduction of penicillin into clinical practice in 1940s. The first pandemic antibiotic resistant strains were penicillin resistant producing PVL (Panton-valentine leucocidin). Wave 2: began almost immediately upon the introduction of methicillin in clinical practice with isolation of first MRSA (Archaic clone) which contained type I SCCmec and extended into 1970s in the form of Iberian clone. Wave 3: began in the mid-to-late 1970s with emergence of new MRSA strains, which contained novel SCCmec, types II and III (MRSA II and III), marking the ongoing worldwide pandemic of MRSA in hospitals. The upsurge in vancomycin usage for treatment of MRSA infections eventually led to emergence of vancomycin intermediate S.aureus (VISA) strains. Wave 4: which began in the mid-to-late 1990s, marks the MRSA strains in the community. Community MRSA strains where susceptible to most antibiotics other than Beta-lactums, were unrelated to hospital strains, contained a nobel, smaller, more mobile type IV SCCmec (MRSA-IV), and a virulent factors, including

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980s</td>
<td>ESBL producing GN bacteria</td>
</tr>
<tr>
<td>1990</td>
<td>VRE (VancomycinResistant Enterococci) emerged</td>
</tr>
<tr>
<td>2000</td>
<td>VISA (Intermediate level resistance Staphylococcus aureus)</td>
</tr>
<tr>
<td>2002</td>
<td>VRSA (High Level resistance Staphylococcus aureus)</td>
</tr>
<tr>
<td>2002</td>
<td>Linezolid resistant enterococci and Staphylococci reported</td>
</tr>
</tbody>
</table>

Table 2: History of Appearance of different types of resistance modes to survive thrust of antibiotics:

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
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</tr>
</tbody>
</table>

Table 3: Modes of action and resistance mechanisms of commonly used antibiotics

<table>
<thead>
<tr>
<th>Antibiotic class</th>
<th>Example(s)</th>
<th>Target</th>
<th>Mode(s) of resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-Lactams</td>
<td>Penicillins (ampicillin), cephalosporins (cephamycin), penems (meropenem), monobactams (aztreonam)</td>
<td>Peptidoglycan biosynthesis</td>
<td>Hydrolysis, efflux, altered target</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>Gentamicin, streptomycin, spectinomycin</td>
<td>Translation</td>
<td>Phosphorylation, acetylation, nucleotidylation, efflux, altered target</td>
</tr>
<tr>
<td>Glycopeptides</td>
<td>Vancomycin, teicoplanin</td>
<td>Peptidoglycan biosynthesis</td>
<td>Reprogramming peptidoglycan biosynthesis</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>Minocycline, tigecycline</td>
<td>Translation</td>
<td>Monooxygenation, efflux, altered target</td>
</tr>
<tr>
<td>Macrolides</td>
<td>Erythromycin, azithromycin</td>
<td>Translation</td>
<td>Hydrolysis, glycosylation, phosphorylation, efflux, altered target</td>
</tr>
<tr>
<td>Lincosamides</td>
<td>Clindamycin</td>
<td>Translation</td>
<td>Nucleotidylation, efflux, altered target</td>
</tr>
<tr>
<td>Streptogramins</td>
<td>Synercid</td>
<td>Translation</td>
<td>C-O lyase (type B streptogramins), acetylation (type A streptogramins), efflux, altered target</td>
</tr>
<tr>
<td>Oxazolidinones</td>
<td>Linezolid</td>
<td>Translation</td>
<td>Efflux, altered target</td>
</tr>
<tr>
<td>Phenicols</td>
<td>Chloramphenicol</td>
<td>Translation</td>
<td>Acetylation, efflux, altered target</td>
</tr>
<tr>
<td>Quinolones</td>
<td>Ciprofloxacin</td>
<td>DNA replication</td>
<td>Acetylation, efflux, altered target</td>
</tr>
<tr>
<td>Pyrimidines</td>
<td>Trimethoprim</td>
<td>C metabolism</td>
<td>Efflux, altered target</td>
</tr>
<tr>
<td>Sulfonamides</td>
<td>Sulfamethoxazole</td>
<td>C metabolism</td>
<td>Efflux, altered target</td>
</tr>
<tr>
<td>Rifamycins</td>
<td>Rifampin</td>
<td>Transcription</td>
<td>ADP-ribosylation, efflux, altered target</td>
</tr>
<tr>
<td>Lipopeptides</td>
<td>Daptomycin</td>
<td>Cell membrane</td>
<td>Altered target</td>
</tr>
<tr>
<td>Cationic peptides</td>
<td>Colistin</td>
<td>Cell membrane</td>
<td>Altered target, efflux</td>
</tr>
</tbody>
</table>
PVL. Vancomycin-resistant S. aureus (VRSA) strains of which 10 or so have been isolated exclusively in health care settings were first identified in 2002.

Gram Negative Bacilli: “Nutty Super Bugs” The term “superbugs” refers to microbes with enhanced morbidity and mortality due to multiple mutations ending high levels of resistance to the antibiotic classes specifically recommended for their treatment; the therapeutic options for these microbes are reduced, and periods of hospital care are extended and more costly. In some cases, “Super Resistant strains” have also acquired increased virulence and enhanced transmissibility. Realistically, antibiotic resistance can be considered a virulence factor. Many of these associated with epidemics of human disease have evolved into multidrug-resistant (MDR) forms subsequent to antibiotic use. For example, MDR M. tuberculosis is a major pathogen found in both developing and industrialized nations and became the 20th-century version of an old pathogen. Other serious infections include nosocomial (hospital-linked) infections with Acinetobacter baumannii, Burkholderia cepacia, Campylobacter jejuni, Citrobacter freundii, Clostridium difficile, Enterobacter spp., Enterococcus faecium, Enterococcus faecalis, Escherichia coli, Haemophilus influenzae, Klebsiella pneumoniae, Proteus mirabilis, Pseudomonas aeruginosa, Salmonella spp., Serratia spp.

A long-recognized hospital inhabitant, the toxin-producing anaerobe Clostridium difficile, is increasingly found as the cause of severe intestinal infections; detection of its toxin in our group of patients was in 8.9 % of the studied patients, recently, hypervirulent toxin-producing strains have been recognized. Being a Gram-positive spore former, it is a hardy organism and is readily transmitted by hospital personnel, on equipment, and as aerosols. Its renewed prominence is considered the result of extensive hospital use of antibiotics such as expanded-spectrum cephalosporins, the newer penicillins, and fluoroquinolones that cause significant depletion of the Gram-negative intestinal microflora, thus enhancing C. difficile colonization. In other words, these infections are the direct result of antibiotic use.

Global Spread of Carbapenemase-producing Enterobacteriaceae: Carbapenemases increasingly have been reported in Enterobacteriaceae in the past 10 years. Klebsiella pneumoniae carbapenemases have been reported in the United States and then worldwide, with a marked endemcity in the United States and Greece. Metallic-enzymes (Verona integron–encoded metallo-β-lactamase, IMP) reported worldwide, with a higher prevalence in southern Europe and Asia. Carbapenemases of the oxacillinase-48 type have been identified mostly in Mediterranean and European countries and in India. Recent identification of New Delhi metallo-β-lactamase-1 producers, originally in the United Kingdom, India, and Pakistan and now worldwide, is worrisome. Detection of infected patients and carriers with carbapenemase producers is necessary for prevention of their spread. Identification of the carbapenemase genes relies mostly on molecular techniques, whereas detection of carriers is possible by using screening culture media. This strategy may help prevent development of nosocomial outbreaks caused by carbapenemase producers, particularly K. pneumoniae.

So, what are the actions taken to combat / reduce the antimicrobial resistance (AMR)?

1. The World Health Organization’s policy package to combat antimicrobial resistance in 2011:
   - Commit to a comprehensive, financed national plan with accountability and civil society engagement
   - Strengthen surveillance and laboratory capacity
   - Ensure uninterrupted access to essential medicines of assured quality
   - Regulate and promote rational use of medicines, including in animal husbandry, and ensure proper patient care
   - Enhance infection prevention and control
   - Foster innovations and research and development for new tools

   Importantly, point fourth is much in our hands, the rational use of antimicrobials is essential for containing antimicrobial resistance. The promotion of national standard treatment guidelines calls for proper training and supervision of health personnel and for mechanisms to make diagnostic support available. To reduce their irrational use, antimicrobials should only be sold with a prescription and this should be strictly enforced in all pharmacies. Independent and unbiased information on antimicrobial use should be provided to health personnel and consumers. Promotional activities by pharmaceutical companies should be regulated and monitored to prevent industry from misinforming...
patients and from offering financial incentives to providers. The overuse and misuse of antimicrobials in animals for human consumption must be addressed through surveillance of antimicrobial use in animals destined for food, training of veterinarians and farmers and, most critically, through legislative and regulatory measures.  

None the less, point Fifth, policies and practices for the prevention and control of infections are indispensable in fighting antimicrobial resistance. A proper organizational structure for developing and managing such policies and practices, combined with environmental designs for their application, need to be adopted in health facilities. These practices are also necessary in congruent settings and communities.

2. World Health Day-7 April 2011- Antimicrobial Resistance: “No action today, No cure tomorrow”, with this slogan WHO encouraged the world to create awareness to curtail or reduce resistance emphasizing on the six-point policy package. Antimicrobial resistance is not a new problem but one that is becoming more dangerous; urgent and consolidated efforts are needed to avoid regressing to the pre-antibiotic era.

3. The Chennai Declaration: a roadmap to tackle the challenge of antimicrobial resistance: “A Roadmap to Tackle the Challenge of Antimicrobial Resistance - A Joint meeting of Medical Societies in India” was organized as a pre-conference symposium of the 2ndannual conference of the Clinical Infectious Disease Society (CIDSCON 2012) at Chennai on 24thAugust 2014. This was the first ever meeting of medical societies in India on issue of tackling resistance, with a plan to formulate a road map to tackle the global challenge of antimicrobial resistance from the Indian perspective. There were representatives from most medical societies in India, eminent policy makers from both central and state governments, representatives of WHO, National Accreditation Board of Hospitals, Medical Council of India, Drug Controller General of India, and Indian Council of Medical Research along with well-known dignitaries in the Indian medical field. The meeting was attended by a large gathering of health care professionals. The meeting consisted of plenary and interactive discussion sessions designed to seek experience and views from a large range of health care professionals and included six international experts who shared action plans in their respective regions. This communication was made at large to most of the health professionals.

4. Actions taken by microbiology department of GCRI to combat antimicrobial resistance: The efforts at GCRI had always been there to abreast the clinicians and those involved in the treatment of the patients about the current scenario of the type of bugs that are causing infections, the deviation from the routine isolation of bacteria, the diversity of their occurrence and the susceptibility pattern over the past two and half decades. The following are the different ways by which the information and the message are transmitted:

1. Data is regularly presented in the clinical meetings.
2. Three monthly data on antibiotic sensitivity on the isolated pathogens is sent to clinicians. Awareness programs by small exhibitions displaying the importance of justified way of use of antibiotics, DOs and DONTs about the inventories of these precious drugs to the institute.
3. Sensitization lectures on antimicrobial resistance are being conducted and experiences from medical and surgical oncology faculties are shared.
4. Awareness program through exhibition in the hospital on the importance of judicious use of antibiotics.
5. Antibiotic policy for the hospital: The primary aim of the hospital antimicrobial policy is to minimize the morbidity and mortality due to antimicrobial-resistant infection; and to preserve the effectiveness of antimicrobial agents in the treatment and prevention of diseases. (Figure 3)

GCRI WHONet generated DATA on hospital associated infection and AMR:
HAI and Surveillance of AMR at GCRI: Generating the DATA of hospital acquired infections and surveillance of AMR at microbiology laboratory is done by WHONet which is a free software developed by the WHO collaborating center for surveillance of antimicrobial resistance for laboratory based surveillance of infectious diseases and antimicrobial resistance which we are using since 1998. This has been a boon to my laboratory for coming out with the data on resistance pattern. Amongst the GPC it is observed that 80% of them are resistant to penicillin, cephalosporin group, teracyclines, erythromycins azothyromycins. Around 81.1% are MRSA strains. Sensitivity been shown by linezolid, vancomycins,teicoplanins. Whereas, there is absolutely no hope of the superbugs being killed by most of the antibiotics used for GNB. There are very few antibiotics like, tobramycin, colistin, nitrofurantoin and tigecyclin which are helpful in treating infections.

Antimicrobial stewardship: Good antimicrobial stewardship involves selecting an appropriate drug and optimizing its dose and duration to cure an infection while minimizing toxicity and conditions for selection of resistant bacterial strains. Antimicrobial stewardship is a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-
resistant organisms.

Core Elements: Stewardship

- **Leadership Commitment**: Dedicating necessary human, financial and information technology resources.
- **Accountability**: Appointing a single leader responsible for program outcomes. Experience with successful programs show that a physician leader is effective.
- **Drug Expertise**: Appointing a single pharmacist leader responsible for working to improve antibiotic use.
- **Action**: Implementing at least one recommended action, such as systemic evaluation of ongoing treatment need after a set period of initial treatment (i.e. “antibiotic time out” after 48 hours).
- **Tracking**: Monitoring antibiotic prescribing and resistance patterns.
- **Reporting**: Regular reporting information on antibiotic use and resistance to doctors, nurses and relevant staff.
- **Education**: Educating clinicians about resistance and optimal prescribing.

Further, this can be effectively assisted by instituting various regulations such as formula restriction, automatic stop-order, prior approval programs, therapeutic substitution, streamlining and antibiotic cycling etc.

**Conclusion**

The discovery of penicillin by Alexander Fleming in 1928 transformed the world of bacteria in our water, sewage, soil, even the bacteria. The new drugs “revolutionized medicine”, transformed human health and saved millions of lives. But in a time blip of just around half a century, it now appears, we have exhausted and oversused antibiotics. We have popped antibiotic pills on the smallest of pretexts, to deal with viral fevers and colds that cannot be treated with antibiotics, for instance. We have stuffed them into our livestock to fatten them and sprayed them on our crops to keep pests away. Superbugs are omnipresent in the biosphere; their consequences are aggravated enormously in volatile situations such as civil unrest, violence, famine, and natural disasters and, of course, by poor or nonexistent hospital practices. Superbugs are not the only microbial threats, but they are recognized as the most menacing with respect to morbidity and mortality worldwide. There is need to take four core actions to fight resistance

**Preventing Infections and Preventing the spread of Resistance**

1. **Tracking**: Gathering data on antibiotic resistant infections, causes of infections and knowing the risk factors that caused some people to get infections. Therefore AMR data is required.
2. **Improving antibiotic prescribing/ stewardship**: Change the ways antibiotics are used. Up to half of antibiotic use in humans and much of it used in animals is unnecessary and in appropriate and makes everyone less safe. Stopping atleast half of the above would greatly help in slowing down the spread of resistant bacteria.
3. **Developing new drugs and diagnostic tests**: Because antibiotic resistance occurs as part of a natural process in which bacteria evolve, it can be slowed but not stopped. Therefore, we will always need new antibiotics to keep up with resistant bacteria as well as new diagnostic tests to track the development of resistance.

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Importance of Immunophenotype in Acute Lymphoblastic Leukemia - A GCRI Study

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Summary
Acute lymphoblastic leukemia are a group of neoplastic disorders characterized by proliferation and accumulation of immature hematopoietic cells in bone marrow, blood, and other tissues. The objective was to study immunophenotyping profile in acute lymphoblastic leukemia, and mixed lineage leukemia and to study its importance in diagnosis. In the study 249 patients diagnosed morphologically with acute lymphoblastic leukemia were included. Out of 249 cases diagnosed ALL morphologically 50(20%) cases T-ALL, 9(4%) cases Pro-B-ALL, 132(53%) cases Pre Pre B-ALL, 46(18%) cases Pre B-ALL, 06(3.1%) case B-ALL, were classified on immunophenotyping. One case (0.5%) was confirmed both T and B ALL and in 05 (2%) cases diagnosis was changed and they were confirmed AML on immunophenotyping. So to conclude it is imperative and absolutely essential to ascertain the lineage of leukemia by immunophenotyping before starting on treatment as more than 25% of patients would not respond or later relapse if treatment is initiated on morphological diagnosis.

Keywords: Leukemia, Immunophenotyping

Introduction
The study of immunological markers is essential for the correct diagnosis and classification of acute lymphoblastic leukaemia (ALL). The diagnosis of acute leukaemia was based primarily on the morphology and cytochemistry of leukaemic cells whereas now the technique of immunophenotyping can be applied to confirm the diagnosis as well as to further subcategorize the disease. The discovery of monoclonal antibodies (McAbs) by Kohler and Milstein in 1975 has made it possible to define the precise stages of differentiation of haemopoietic Cells and resulted in tremendous advancement in the classification of leukaemia. Using cytological and cytochemical methods leukaemia designated as acute undifferentiated leukaemia can now be appropriately classified by McAbs specific for lymphoid, myeloid, erythroid and megakaryocytic cells. ALL blast cells can be immunophenotype into either B-lineage or T-lineage. B-lineage-ALL includes (1) Pro B-ALL; (2) Pre Pre B-ALL: CALM positive; (3) Pre-B-ALL, (4) Early B-ALL cytoplasmic ‘mu’ chains present and (5) Classical B-ALL: mature, surface immunoglobulin positive blasts. These immunotypes represent progressively maturing stages of B-lineage cells. The significance of ALL immunotype as an independent predictor of response to treatment has been reported. Common-ALL has the most favourable prognosis both in children and adults. T-ALL has a significantly poorer prognosis than non T-ALL. Therefore the precise characterization of leukaemic blasts is critical to establish an accurate prognosis and optimal therapeutical approach. It permits the use of more intensive treatment protocol in those patients who have been identified as having an unfavourable outcome at the time of diagnosis. The present study was designed to identify the immunological markers on the lymphoblasts of ALL in order to see the frequency of various immunophenotype of ALL in our institute.

Materials and Methods
Subjects for Study
The study was conducted in the Department of Pathology, Gujarat Cancer and Research Institute, Ahmedabad, India, from January 2014 to December 2014. All the new cases of acute lymphoblastic leukemia, (ALL: B-ALL and T-ALL), diagnosed morphologically were enrolled in this one year period.

Sample Collection and Preparation
The bone marrow or peripheral blood was collected in ethylenediaminetetraacetic acid vacutainer for peripheral smear examination and immunophenotyping. A morphological evaluation was done from the Wright-stained peripheral smears and bone marrow aspirates using French–American–British classification of acute lymphoblastic leukaemias. Special relevant cytochemical stains like PAS and Sudan black-B were performed on the bone marrow aspirates in all cases. Final diagnosis of acute lymphoblastic leukemia was based on morphological examination, cytochemistry along with full panel of flow cytometric immunophenotyping. All the samples were processed within 24 hours.

Multicolor Monoclonal Antibody Combination
The monoclonal antibodies used in the primary panel were CD 45 (PerCP), CD 22 (FITC), CD 34 (PE), CD 5 (PE Cy7), CD 10 (APC), CD 19 (APC-H7), CD 7 (FITC), CD 13 (PE), CD 33 (PE Cy7), CD 117 (APC), HLA-DR (APC-H7), MPO
FITC), cCD 79a (PE), cCD 3 (PE Cy7), and Tdt (APC) and in the secondary panel for B-ALL were CD20, CD45, CD34, CD19, CD10, CD38 and for T-ALL were CD4, CD45, CD19, CD99, CD5, CD2, Tdt, CD8. The CD45 was used for blast gating for both surface and cytoplasmic markers. The antibodies were procured from BD Biosciences, USA.

Flow Cytometric Immunophenotyping

For surface markers, respective antibody (20 μl) mentioned above was added in six-color combination to the bone marrow or peripheral blood (100 μl) and incubated for 15 min. After incubation, 2 ml of erythrocyte lysing solution (1:10 dilution with double distilled water; BD Biosciences, USA) was added and incubated for 15 min at room temperature. Then, cells were centrifuged at 400 g for 5 min and supernatant was discarded. Remaining pellet was washed twice with phosphate-buffered solutions (PBS). For surface and cytoplasmic markers, negative control tubes were run simultaneously with the addition of sample and CD45 antibody.

Acquisition and Data Analysis

The cytometer setup and tracking beads were (BD Biosciences, USA) used for daily calibration of the instrument. The samples were then acquired in FACS Canto II flow cytometer (6-color, 2-Laser, BD Biosciences, USA) and analyzed using FACS Diva software (BD Biosciences, USA). At least 30,000 total cells were acquired, and the side scatter versus CD45 PerCP dot plot was used for blasts gating. The percentage of positive cells more than 20% was considered positive for that surface or intracellular markers.

Results

A total 249 cases of acute lymphoblastic leukemia, the distribution of cases according to Immunophenotyping profile was: Immunophenotyping profile in to B-ALL (193 cases: 77.5%), T-ALL (50 cases: 20%), both B and T ALL (01 case: 0.5%), AML (05 cases: 02%) respectively (Table 1). Further B-ALL is subdivided in to four subgroups based on immunological classification. Out of 193 cases diagnosed as B-ALL, 09 cases (4.6%) Pro B-ALL, 132 cases (68.5%) Pre B-ALL, 46 cases (23.8%) Pre B-ALL, 06 cases (3.1%) were subgrouped as mature B-ALL (Table 2).

Immunophenotypic Profile of B-ALL

CD 79a (98.44%) and CD 19 (96.3%) were the most common B lymphoid antigen expressed along with HLA-DR (97.4%) and CD 10 (93.26%) respectively. Myeloid markers like CD 13 (27.4%) and CD 33 (22.2%) and CD 117 (5.69 %) were expressed respectively along with aberrant expression of MPO in 2% cases (Table 3).

Immunophenotypic Profile of T-ALL

CD 3 and CD 7 were most expressed markers in T ALL, both were positive in all 50 cases: (100%), along with CD 5 (92%), CD 10 (44%) and Tdt (78%) respectively. Myeloid antigen CD 13 and CD 33 were expressed 12% and 10% respectively. (Table 3)
**Table 3: Frequency of Various Surface and Cytoplasmic Markers Expression in ALL**

<table>
<thead>
<tr>
<th>Immuno Markers</th>
<th>B-ALL (n=193)</th>
<th>T-ALL (n=50)</th>
<th>Biphenotypic ALL (n=01)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>CD22</td>
<td>105 (54.40)</td>
<td>01 (02)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD34</td>
<td>140 (72.50)</td>
<td>24 (48)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD5</td>
<td>10 (5.10)</td>
<td>46 (92)</td>
<td>01 (100)</td>
</tr>
<tr>
<td>CD10</td>
<td>180 (93.26)</td>
<td>22 (44)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD19</td>
<td>186 (96.37)</td>
<td>04 (08)</td>
<td>01 (100)</td>
</tr>
<tr>
<td>CD7</td>
<td>08 (4.10)</td>
<td>50 (100)</td>
<td>01 (100)</td>
</tr>
<tr>
<td>CD13</td>
<td>53 (27.46)</td>
<td>06 (12)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD33</td>
<td>43 (22.27)</td>
<td>05 (10)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD117</td>
<td>11 (5.69)</td>
<td>03 (06)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>HLA-DR</td>
<td>188 (97.40)</td>
<td>12 (24)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>CD79a</td>
<td>190 (98.44)</td>
<td>03 (06)</td>
<td>01 (100)</td>
</tr>
<tr>
<td>CD3</td>
<td>11 (5.69)</td>
<td>50 (100)</td>
<td>01 (100)</td>
</tr>
<tr>
<td>TdT</td>
<td>170 (88.08)</td>
<td>39 (78)</td>
<td>00 (00)</td>
</tr>
<tr>
<td>MPO</td>
<td>04 (2.07)</td>
<td>00 (00)</td>
<td>00 (00)</td>
</tr>
</tbody>
</table>

**Immunophenotypic Profile of Biphenotypic-ALL**

One case was diagnosed as Biphenotypic-ALL on immunophenotyping based on expression of following markers CD 5, CD 19, CD 7, CD 79a and CD 3 were positive. In this markers of both B cell and T cell lineage were positive.

**Discussion**

T-cell ALL has been correlated with poor prognosis in many studies, also, these patients are at a higher risk of induction failure. In our study, the incidence of T-cell ALL was 20%. This was in line with the data presented by Advani et al (20.7%). However, another Indian study by Arya et al reported a 31% incidence of this phenotype. Another recent Eastern Indian study reported 50.4% incidence of T-cell immunophenotype. Western studies have reported <10% incidence. These data clearly establish the difference in the biologies of ALL in India from the western world. (Figure 1)

Around 90% precursor B-cell ALLs express CD10 surface antigen (known as common ALL antigen; CALLA). The absence of CD10 is associated with MLL translocations, particularly t (4; 11) and poor outcome. CALLA-positive patients had a much better 5-year relapse-free survival than CALLA-negative patients.

Difference in the incidence of distribution of various subtypes of ALL may have some regional influences which needs further evaluation.

Hoffbrand et al, San Miguel et al, Griffin et al in their studies have shown that the morphological diagnosis is not very reliable in conclusively diagnosing acute leukemia. Immunophenotyping is mandatory for establishing the confirmed diagnosis of acute leukemia and their subtypes. In up to 25% cases the immunophenotyping for cell antigen marker change the lineage of leukemia.

**Conclusion**

Flowcytometry has become an indispensible tool for diagnosis and classification of acute leukemia. Lineage assignment is critical for optimal therapy of acute leukemia. This study characterizes various cytoplasmic and surface markers expressed in acute lymphoblastic leukemia. Flow cytometry-based immunophenotyping has important role in accurate classification and diagnosis of acute leukemia. Intracellular and surface markers expressed earliest phase of disease and has good specificity for lineage determination in acute leukemia blasts. It is imperative and absolutely essential to ascertain the lineage of leukemia by immunophenotyping before starting on treatment as more than 25% of patients would not respond or later relapse if treatment is initiated on morphological diagnosis. It should be used together with adequate clinical information and morphology for comprehensive diagnosis.

Financial Support and Sponsorship: Nil
Conflicts of Interest: No, author has no competing interest.

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A Seven Years Retrospective Study of Prevalence of Viral Infections in Diverse Cancer Patients Admitted for Treatment in a Regional Cancer Center

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Summary
Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) are public and global health problems. The study of seroprevalence is important to assess magnitude of disease transmission and aid in devising preventing measures. This was a retrospective analysis carried out in department of Microbiology, GCRI from January 2011 to December 2017. Between this periods a total of 2,07,258 blood samples were received for screening of HbsAg, 1,97,172 samples for HIV antigen and antibody and 1,68,282 for anti-HCV from different units of the hospital. All samples were tested by Enzyme Linked Immuno Sorbent Assay (ELISA) on fully automated ELISA system. Infection rate of HBV was 3.09%, HIV was 0.80%, and HCV was 0.59% in cancer patients in GCRI. Prevalence rate was higher in females as compared to males i.e. 0.49% vs. 0.31% for HIV infections, whereas it was more in males as compared to females for HCV and HBV i.e. 0.35% vs. 0.24% and 2.06% vs. 1.04% respectively. Seroprevalence of blood borne viral infection was found to be highly significant (p=0.0001) as compared to the healthy donors in GCRI. Over a period of seven years prevalence rate of HBV and HCV shows declining trends in the hospital from 4.41% to 2.55% and 0.68% to 0.42% respectively. In order to prevent transmission of these infections, educational program and screening to target group as well as illiterate people in collaboration with health care providers are required.

Keywords: Seroprevalence, HIV, HBV, HCV, Cancer patients

Introduction
Infection by human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are serious public and global health problems and they are major cause of morbidity and mortality throughout the world.1 HIV is a retrovirus, a member of lentivirus genus and the etiologic agent of acquired immunodeficiency syndrome (AIDS). Each year, as per WHO that 90% of new HIV infections occur in developing countries. In India, AIDS is overwhelmingly a heterosexually transmitted disease for which antiretroviral drugs are used for prevention and treatment of AIDS. In India HIV prevalence rate ranges from 0.28% to 3.14% in different population groups according to HIV sentinel surveillance 2016-17 reports (NACO). Different states of India show prevalence rate between 0-1.19%. Gujarat is having infection rate of 0.44% as per this report.2 As per CDC testing guidelines, for testing HIV in 2001 was to screen all high risk patients like injection-drug users and their partners, sex partner of HIV infected patients etc. Later in 2006, guidelines has focused on all patients ages 13 to 64, without regards to risk, including all high risk cases.3

HBV genus orthohepadna virus belongs to Hepandnaviriade family. It is highly infectious viral disease and can be transmitted through blood transfusion, vertical transmission, homo-heterosexual contact or through percutaneous route. Due to chronic sequelae e.g. chronic hepatitis, cirrhosis and hepatocellular carcinoma; millions of deaths reported annually.4 In India, the overall infection rate of HBV has been reported to range between 2 - 8 % with an average of 4.7%.4 HBV carrier rate is 3%. India harbors 10-15 % of the entire pool of HBV carriers of the world.5 According to CDC recommendation for routine testing and follow-up for HBV infection 2008 guidelines, persons needing immunosuppressive therapy, including chemotherapy require routine screening for HBV infection.6

HCV, genus hepacivirus and is a member of flaviviridae family. Infections by HCV are distributed worldwide. The direct percutaneous exposure to blood and blood products accounts for major route of transmission of this infection. Nearly 75-85% of patients develop chronic disease after acute infection which depends upon factor influencing interaction between host and HCV.7 Prevalence of HCV infections is variable according to geographical distribution, routes of transmission. Higher prevalence is found in developing countries where limited resources and facilities are available, central and east Asia as well as Africa is the most affected region in the world.8,9 Therefore we intended to have an awareness regarding the prevalence of these blood borne viral infections in GCRI and the need for taking appropriate actions to prevent HBV, HCV and HIV transmission.

Material and Methods
Routine screening of viral agents like HIV, HBV and HCV is requested in all admitted patients who will be taking treatment under different disciplines of the hospitals as an institutional policy. Over the period of years the burden of these virus and seroprevalence is not known. Therefore, to know the seroprevalence of these viruses we have
retrospectively studied the prevalence in our group of patients. The retrospective analysis was done from January 2011 to December 2017. The clinical history of patients was recorded. For HIV testing, pre and post test counseling was done and written consent was taken as per NACO guidelines.

Blood samples of the patients were received in Microbiology laboratory for screening of HbsAg (2,07,258), HIV (1,97,172) and HCV (1,68,282) from different departments of GCRI.

For control group, retrospective data was taken from healthy donors from blood bank of GCRI. Over a period of two year (January 2017 to October 2018) HIV , HCV and HbsAg 19,714 blood donors were screened for HIV, HCV and HbsAg.

All samples were tested on fully automated ELISA system (Euphoria 4.1, Tulip diagnostics) using by Enzyme Linked Immuno Sorbent Assay (ELISA) kits (Qualisa, Tulip Diagnostics). All positive samples were tested twice to confirm the result according to the set guidelines as per kit protocols. For HIV, the reports were dispatched after performing the tests as per NACO guidelines, using three different principles. The principles of the tests were ELISA (Qualpro, Tulip diagnostics), rapid immunochromatography (TRI-DOT, J.Mitra, India) and Enzyme Linked Fluorescence assay (ELFA) (MINI-VIDAS, Biomerieux, France) according to NACO guidelines.

Prevalence rate was expressed as the number of positive samples divided by the total samples tested.

\[
\text{Prevalence rate} = \frac{\text{No. of positive samples}}{\text{Total samples tested}}
\]

Statistical analysis was performed using SPSS (SPSS Inc, Chicago, IL version 13). For all statistical analysis, p value of less than 0.05 was considered significant.

**Table 1: Prevalence of blood borne viral infection in different units of the hospital from 2011-2017**

<table>
<thead>
<tr>
<th>Oncology Units</th>
<th>Total HIV samples</th>
<th>HIV Positive</th>
<th>%</th>
<th>Total HBV samples</th>
<th>HBV Positive</th>
<th>%</th>
<th>Total HCV samples</th>
<th>HCV Positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDICAL-1</td>
<td>19555</td>
<td>162</td>
<td>0.83</td>
<td>20615</td>
<td>1053</td>
<td>5.11</td>
<td>17097</td>
<td>136</td>
<td>0.80</td>
</tr>
<tr>
<td>MEDICAL-2</td>
<td>16910</td>
<td>150</td>
<td>0.89</td>
<td>17851</td>
<td>900</td>
<td>5.04</td>
<td>12154</td>
<td>90</td>
<td>0.74</td>
</tr>
<tr>
<td>MEDICAL-3</td>
<td>9768</td>
<td>101</td>
<td>1.03</td>
<td>10497</td>
<td>673</td>
<td>6.41</td>
<td>8886</td>
<td>65</td>
<td>0.73</td>
</tr>
<tr>
<td>TOTAL</td>
<td>46233</td>
<td>413</td>
<td>0.89</td>
<td>48963</td>
<td>2626</td>
<td>5.36</td>
<td>38137</td>
<td>291</td>
<td>0.76</td>
</tr>
<tr>
<td>GYNEC-1</td>
<td>8461</td>
<td>92</td>
<td>1.09</td>
<td>8898</td>
<td>149</td>
<td>1.67</td>
<td>7401</td>
<td>46</td>
<td>0.62</td>
</tr>
<tr>
<td>GYNEC-2</td>
<td>7005</td>
<td>91</td>
<td>1.30</td>
<td>7331</td>
<td>131</td>
<td>1.79</td>
<td>6835</td>
<td>41</td>
<td>0.60</td>
</tr>
<tr>
<td>GYNEC-3</td>
<td>5469</td>
<td>67</td>
<td>1.23</td>
<td>5761</td>
<td>127</td>
<td>2.20</td>
<td>4015</td>
<td>23</td>
<td>0.57</td>
</tr>
<tr>
<td>GYNEC-4</td>
<td>675</td>
<td>7</td>
<td>1.04</td>
<td>680</td>
<td>11</td>
<td>1.62</td>
<td>690</td>
<td>3</td>
<td>0.43</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21610</td>
<td>257</td>
<td>1.19</td>
<td>22670</td>
<td>418</td>
<td>1.84</td>
<td>18941</td>
<td>113</td>
<td>0.60</td>
</tr>
<tr>
<td>SURGICAL-1</td>
<td>36459</td>
<td>259</td>
<td>0.71</td>
<td>37716</td>
<td>833</td>
<td>2.14</td>
<td>30547</td>
<td>165</td>
<td>0.54</td>
</tr>
<tr>
<td>SURGICAL-2</td>
<td>30362</td>
<td>252</td>
<td>0.83</td>
<td>31362</td>
<td>672</td>
<td>2.19</td>
<td>26535</td>
<td>158</td>
<td>0.60</td>
</tr>
<tr>
<td>SURGICAL-3</td>
<td>15883</td>
<td>96</td>
<td>0.60</td>
<td>16625</td>
<td>377</td>
<td>2.27</td>
<td>15779</td>
<td>91</td>
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Results

Out of total 5,72,712 blood samples tested between study periods, blood borne viral infection rate was 4.12%. Infection rate of HBV was 3.09%, HIV was 0.80%, and HCV was 0.59% in cancer patients in GCRI. (Figure 1). Prevalence rate was higher in females as compared to males i.e. 0.49% vs. 0.31% for HIV infections, whereas it was more in males as compared to females for HCV and HBV i.e. 0.35% vs. 0.24% and 2.06% vs. 1.04%, respectively.

Figure 2 shows year wise trend analysis of seroprevalence of HBV, HIV and HCV in GCRI from 2011-2017. HIV prevalence rate ranges from 0.62% to 0.97%. HBV and HCV infectivity rate was between 2.35-4.14% and 0.42-0.79%, respectively.

Prevalence of blood borne viral infection in different units of the hospital shown in Table: 1, and in figures 3 - 5. In Medical department, prevalence rate of HIV was 0.89%, HBV was 5.36% and HCV was 0.76%. In Gynec department, prevalence rate of HIV was 1.19%, HBV was 1.84%, and HCV was 0.60%. In Surgical department, prevalence rate of HIV was 0.73%, HBV was 2.32% and HCV was 0.53%.

Out of 19,714 blood bags screened, prevalence of HIV infection was 0.22%, HBV was 0.62% and HCV was 0.21%. Seroprevalence of blood borne viral infection was found to be highly significant (p=0.0001) as compared to the healthy donors in GCRI.

Discussion and Conclusion

Over seven years period, prevalence of HBV was 3.09%, as against the finding of Prakriti vohra et al from Haryana, where they had 5.3%, Bhatta et al had 2.5% and Sood et al had 2.28%

HIV prevalence was 0.80% (range: 0.62 - 0.97%) in our study periods in GCRI. Vohra et al observed 1.26% HIV prevalence in Haryana. According to NACO sentinel surveillance report 2016-17, HIV prevalence was between 0.28-6.26% in India.

In our study HCV prevalence was 0.59% with a range of 0.42-0.79% in seven years was noted. Vohra et al observed a similar rate (0.68%). In India
reported prevalence rates vary widely in range of 0.09% to 2.02%.

In present study, females showed a higher HIV seropositivity than males, which matches with the studies by Vohra et al11 and Shivekar et al1 HBV and HCV seropositivity showed a male predominance, same was observed by Vohra et al1 and Sood et al12.

According to figure-3, the prevalence rate of HIV infection was high in gynec (22%) and medical (16%) department as compared to other departments. Figure-4 and 5 shows that HBV (25%) and HCV (19%) infection rate was high in medical department, respectively.

Over a period of seven years prevalence rate of HBV and HCV shows declining trends in the hospital from 4.41% to 2.55% and 0.68% to 0.42% respectively.

It is mainly due to:
1. Better screening of blood donors in GCRI by Chemiluminecence for blood borne viral infection.
2. Vaccination of pediatric patients against HBV infection
3. Strict sterilization and disinfection practices in GCRI

In order to prevent transmission of these infections, educational program and screening to target group as well as illiterate people in collaboration with health care providers are required.14 Further study of the seroprevalence of various diseases in the community can be useful while formulating new policies to combat these diseases.

Acknowledgement: We thank Ms. Bijal Patel and Ms. Rinkal Patel, laboratory technicians for compiling the data.

References
7. Center for Disease Control and Prevention. Recommendation for Identification and public health management of persons with chronic hepatitis B virus infection. MMVR 2008: 57 (No.RR-8)
Cancer: Can Meditation Help?

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There is a plethora of articles on meditation and its effect on cancer but to understand the relationship we must first know, what is meditation?

The earliest reference of Meditation or Dhyana is found in Vedas and Upanishads that describe meditation as awareness of self and unifying (yoga) process. Yoga (to be pronounced as yog with emphasis on G, hence the A after that and not yoga) is derived from the word “Yuj” which means “to unite”. The end goal of meditation or yoga is to be one with The Almighty power that dwells within us (perceive the self (ātman) within oneself) which brings eternal bliss.

According to Patanjali’s yoga sutra ©. (400CE), meditation is the seventh of eight limbs of Yoga - which are ethical discipline (yamas), rules (niyamas), physical postures (āsanas), breath control (prāṇāyama), withdrawal from the senses (pratyāhāra), one-pointedness of mind (dhāranā), meditation (dhyāna), and finally samādhi. Dhyana is also mentioned in many chapters (adhyaya) of Bhagvan Gita and the 6th Adhyaya is called ‘Dhyana Yoga’.

Since the 19th century, it has spread to other cultures leading to many different traditions and ways of meditating that are advocated to have different affects. Some common forms of meditation are loving-kindness type where you open your mind to kindness and love and it helps in various mental stress disorders. Other is body scan - progressive relaxation type that helps in chronic pain. Then there is mindfulness which asks you to focus on the present and it improves memory, emotion and focus. Breath awareness is a common form practiced to reduce anxiety, increase concentration. Kundalini yoga combines physical activity with chanting of mantras and it has shown to improve physical strength and mental health. The Zen and Transcendental meditation incorporate spiritual aspect with physical posture and mental mindfulness.

Meditation leads to a state of ‘thoughtless awareness’ in which the mind is alert but excessive stress producing activity of the mind is neutralised. Authentic meditation enables one to focus on the present moment rather than dwell on the unchangeable past or undetermined future.

Cancer and meditation

The diagnosis of cancer brings with it a plethora of emotional, mental distress both for the patients as well as their loved ones. Most cancer care givers – doctors, nurses, social support groups mainly focus on the physical treatment. There is increasing awareness that psychosocial interventions can facilitate adaption during active treatment of cancer and during survivorship. There are many books, blog articles, interviews where patients who have taken conventional treatment for cancer along with these alternative treatments attribute their cure to these alternative methods alone. Their stories and headlines like “Curing cancer naturally. By Mehta” are so persuasive that they influence other patients to abandon proven methods of treatment of cancer and go for such natural cure. Many follow their footsteps with the concept that it can do no harm but some unfortunate patients (even those with potentially curable malignancies) abandon or refuse standard treatment, relying totally on these alternative methods hoping for miraculous cure, with dire consequences. I believe in miracles because you see them around you all the time, the first beat of a child’s heart, the first expiration in the form of crying followed by inspiration to avoid aspiration of fluid, a tree growing from a small seed, they are all miracles but in absence of any scientific evidence to support these claims it is necessary to stress that meditation helps patients adapt and handle the symptoms of cancer as well side effects of cancer treatment but there is no scientific evidence to prove that natural method like meditation can prevent or cure cancer on its own.

How does meditation help cancer patient?

Meditation increases peace of mind, reduces stress, relieves pain and anxiety, and may strengthen the will to live and cope with symptoms of cancer as well as toxicity of treatment. The theoretical explanation for the effects of meditation and relaxation techniques is that the release of catecholamines and other stress hormones are reduced and parasympathetic activity is increased.

A 2011 study showed that most patients who participated in the mindfulness based stress reduction program (MBSR) expressed a number of perceived positive effects including increased calm, enhanced sleep quality, more energy, less physical pain, and increased well-being. These findings show that through mindfulness, you may be able to enhance your capacity to handle the life stresses that affect the body’s ability to heal.

Vivekananda Yoga Anusandhana Samsthana have carried out collaborative research studies on Breast Cancer with MD Anderson Cancer Centre in Texas, USA. Consistent improvements have been reported in anxiety, symptom severity, distress, nausea, vomiting and global QOL14 as well as beneficial effects on natural...
killer cell counts and radiation-induced DNA damage. A 2013 study in Norway found that regular practice of gentle yoga and meditation had a rapid effect at the genetic level in circulating cancer-fighting immune cells. Mindfulness meditation also appears to change the brain and immune function in positive ways.

A study by Carlson et al showed that MBSR participation was associated with enhanced quality of life and decreased stress symptoms in breast and prostate cancer patients. This study is also the first to show changes in cancer-related cytokine production associated with program participation. Some studies have shown that meditation can improve cognitive functioning (chemobrain) as well reduce cancer fatigue.

Meditation has also shown to increase melatonin which is linked to restful sleep, immune system enhancement, slowed aging and most recently, reduced severity of diseases such as cancer. Research shows that meditation significantly increases melatonin production. Another advantage of meditation is that many people who practice meditation and Yoga regularly make healthy life decisions like avoiding tobacco usage and binge eating, which have added benefit on their overall health. Obesity is implicated in both cancer incidence and recurrence. In the United States, excess body weight is thought to contribute to as many as one out of five cancer-related deaths, and being overweight or obese is clearly linked with an increased risk of several types of cancer. Yoga can help cancer survivors manage weight gain, which improves self-esteem and the ability to function normally, and ultimately reduces the risk of recurrence and mortality.

**How and when to practice meditation?**

It should be a way of life. Meditation has immediate feel-good effects but its true goal lies in consistent practice. It is said in the Bhagvad Gita,

```
युवावबोधययोगोभवितदः ु खहा॥६
युाहारिवहारययुचेयकमसु।
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One who eats sparingly, who sleeps just adequately and who is skillful in action, for such a person Yoga becomes a “killer of dukhka (distress or misery)” (Bhagavad Gita 6:17).

By integrating meditation into our daily routine, as a part of holistic practice including proper diet, exercise, avoiding smoking, use of tobacco in various other forms, psychedelic drug addictions, and consumption of alcohol one can reduce the risk of developing many diseases including cancer.

The goal of meditation is to go beyond the mind and experience our essential nature—which is described as peace, happiness, and bliss (samadhi). But the mind itself is the biggest obstacle standing between us and this awareness, as it is difficult to discipline it or to guide it on a particular path. Most people who sit for meditation experience only fantasies, daydreams, hallucinations or fall off to sleep. They never attain the stillness that is the hallmark of genuine experience of deep meditation. It requires years of practice and discipline under the guidance of a knowledgeable Guru.

Don’t be disheartened if you cannot achieve the ultimate stage because even the regular practice of meditation (Sadhna) has many positive effects on our mind and body.

**Reference:**

7. Gregory A, Tooleya Stuart M, Armstrong Trevor R: Normanc Avni Salid, Acute increases in night-time plasma melatonin levels following a period of meditation. Biological Psychology 2000; 69-78
Primary Adenocarcinoma of Lacrimal Gland: A Rare Case Report

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Summary
Primary adenocarcinomas of the lacrimal gland are very rare which usually arise de novo. They share similar morphopathological characteristics with salivary gland tumors. We presented a case of 40 years old female with adenocarcinoma of lacrimal gland. CT showed a mass lesion in superolateral aspect of right orbit for which excision was done. She presented with recurrent lesion after three years of surgery. Lacrimal gland tumors are rare but very aggressive and poor prognostic tumors. Complete excision with adjuvant treatment is recommended.

Keywords: Primary adenocarcinoma, lacrimal gland, CT scan, MRI scan

Introduction
Tumors originating from the lacrimal gland account for approximately 10% of orbital tumors and have a large number of anatomic and pathological types. Among these, malignant epithelial tumors of the lacrimal gland are extremely rare, constituting less than 5% of all orbital lesions. Primary adenocarcinomas of the lacrimal gland are very rare, accounting for only 5-7% of epithelial tumors of the lacrimal gland, more common among females than males. They are classified according to the histologic classification of salivary gland tumors because of their identical morphopathological features.²⁻⁵ It usually arise de novo and in only one case it was found as a malignant component of carcinoma ex pleomorphic adenoma.³ Primary adenocarcinoma is an aggressive malignancy that has a poor prognosis.³ Here, we report a case of adenocarcinoma of the lacrimal gland.

Case Report
Our patient was a 40-year-old female with no previous medical history. She presented with right sided supra orbital pain, swelling right eyelid. She also complained of reduced vision in right eye and displacement of eyeball downward. On examination, there was swelling over right eyelid and proptosis with medial and inferior displacement of eyeball. A computed tomography scan was done that revealed a well defined space occupying lesion in superolateral part of extraconal compartment of right orbit within lacrimal fossa. Lacrimal gland tissue was not seen separately from the lesion. Lesion appeared hypodense separately from the lesion. Lesion appeared hypodense on pre contrast study. Lesion displaced eyeball antero- medially without invasion. There was mild cortical irregularity noted in adjacent wall of orbit suggestive of aggressive nature, however no evidence of frank erosion noted. There was no evidence of fat stranding or oedematous changes noted in adjacent extra ocular muscles to suggest inflammatory etiology. There was no evidence of thickening noted in eyelids. Provisional diagnosis of primary lacrimal malignant lesion was formed. (Figures1,2). She underwent excision of lesion. Histological studies showed high grade adenocarcinoma (Figures 3,4). The lesion was involving the periorbital fat. The whole mass was separated from the adjacent periosteum and removed while preserving the eyeball and lateral rectus muscle which was abutting the tumor without invasion. Three years after surgery, during which she had lost follow-up, she presented with recurrence of symptoms. An MRI scan was done which showed altered signal intensity lesion in retro bulb space in extraconal compartment supero-laterally at operated site. Lesion appeared hypointense on T1w images, hyperintense on T2w images. Lesion showed post contrast enhancement. Lesion was abutting and displacing right eyeball medially and inferiorly with mild proptosis. Lesion was abutting right superior and lateral rectus muscles with loss of fat plane. Optic nerve appeared free. Possibility of recurrent lesion was given. (Figures 5-7). Biopsy was done from the lesion which showed recurrent lacrimal gland adenocarcinoma for which chemotherapy was given but lesion did not show any significant reduction in size over period of 2 months. Thus right orbital exenteration was done which showed recurrent carcinoma in right orbit infiltrating extraocular muscles with other contents including optic nerve and eyelids being free of tumor.

Discussion
Tumors of the lacrimal gland constitute around 10% of all biopsied orbital lesions.¹ Adenocarcinoma represents only 5 to 7% of epithelial tumors of the lacrimal gland.² The most common epithelial malignancy is primary adenoid cystic carcinoma. There is no specific histopathologic classification for lacrimal gland tumors, but they share many similarities with salivary gland tumors, so classified according to the histological classification of salivary gland tumors.¹⁴ Most reports in the literature are case reports describing an aggressive nature of the lesion.¹³ The tumor usually begins as a growth near upper eyelid presenting as lid...
pseudoptosis, exophthalmoses pain, and reduced visual acuity. There is tendency of early lymphatic invasion and spread in the nasal cavity, paranasal sinuses, thus signifying poor prognosis. The tumor is very aggressive with early local and distant metastasis and high rates of local recurrences. The death rate of these tumors is approximately 70%, and it usually occurs 2 to 3 years after the initial presentation. The most common sites of metastasis are the lung, the bones, the liver, and the brain. The purpose of the treatment is early primary tumoral control. Usual treatment recommendation is complete excision with adjuvant radiotherapy. Even if no lymph nodes are palpable, regional lymph node dissection and/or radiotherapy should be done.

Conclusion

Primary adenocarcinomas of lacrimal glands are aggressive tumors with poor prognosis. Early recognition and appropriate treatment in the form of complete excision with adjuvant treatment may help to improve the outcome.

Ethical issues: None

References:

Figures 1, 2: CT scan images showing enhancing mass lesion in superolateral compartment of right orbit.

Figures 3, 4: Histopathological slides showing high grade adenocarcinoma in low and high power respectively.

Figures 5, 6, 7: MRI images showing T2 hyperintense, T1 hypointense and post contrast enhancing mass lesion in right orbit superolaterally.
Acute Myeloid Leukemia with Bombay Blood Group:
A Diagnostic and Therapeutic Challenge

Patel Priyanka, Anand Asha, Parikh Sonia, Panchal Harsha, Patel Apurva, Shah Sandip, Kusumgar Rima

Introduction
Bombay blood group is a very rare type of blood group with incidence of 0.0004% in the world. Individuals with rare Bombay phenotype do not express H antigen, the antigen which is present in blood group O. Bombay blood group can be misdiagnosed because usual tests for ABO blood group system would show them as group O and patient can be transfused mismatched blood which can be fatal. Here we report a case of 42 year old female diagnosed as Acute Myeloid Leukemia (AML) at private hospital and transfused 4 units of O positive PCV following which she developed jaundice and was referred to GCRI. Our blood bank had difficulty in finding the exact blood group but on subsequent work up it was found to be Bombay blood group and it was reconfirmed at National Institute of Immunology, Mumbai. As Bombay blood group is rare in Gujarat she was referred to Mumbai for further treatment. None of her siblings tested positive for Bombay blood group.

Case Report
A 42 year old female presented at private hospital with chief complains of fever and malaise for last 7 days. She was investigated at private hospital and diagnosed as having acute myeloid leukemia. Her routine investigations showed hemoglobin of 4.6gm/dl, total leucocyte counts of 4600/cumm, platelet count of 19000/cumm. She had been transfused 4 units of packed cell volume of O positive blood group at the same hospital. Her baseline renal and liver function tests were normal. Her bone marrow aspiration done at private hospital showed 72%myeloblasts suggestive of AML. Post - transfusion she developed jaundice, with her serum total bilirubin being 39mg/DL of which direct was 33.3mg/dl. She was transferred to GCRI for further management on 22/8/2016. On general examination, icterus was present. There was no evidence of lymphadenopathy. Systemic examination was normal. Her primary diagnosis of AML was confirmed with her bone marrow aspiration showing 45% myeloblasts suggestive of AML-M1. Immunophenotyping study showed CD13, CD33, CD117 and MPO positivity suggestive of AML. Patient’s conventional cytogenetics was normal and Fluorescence In Situ Hybridisation (FISH) was negative for t (8; 21) and inv (16). Viral markers (HIV, HBsAg, and HCV) were negative. Urine routine examination showed presence of bile salt with bile pigments and plenty of red blood cells. Ultrasonogram of abdomen revealed normal liver texture.

She had never received blood transfusion and never underwent major surgery in past. She had history of 2 normal deliveries At our centre she was found to be having Bombay blood group. Her indirect Coomb’s test was positive suggesting alloimmunisation. Her antibody screening and identification showed pan positivity with negative auto control which was also suggestive of antibody against high frequency antigen (Anti H) and it was confirmed at National Institute of Immunohematology, Mumbai. She was then transfused four units with compatible packed cell volumes arranged through blood bank of our hospital and Bombay Think foundation. She was started on IV methylprednisolone in view of mismatch blood transfusion reaction after which her serum bilirubin came down to 5mg/dl in 3 days. She was planned for conventional 7+3 Induction chemotherapy but due to non - availability of blood and donors of Bombay blood group in Gujarat, she was transferred to Tata memorial Hospital, Mumbai.

In our case four units of packed cell volumes of O positive blood group were transfused at private hospital. Despite this patient had no major symptomatic blood transfusion reaction except direct hyperbiliurinemia and her direct coomb’s test was also negative. These were misleading factors in deciding patient’s exact blood group.

Discussion
H antigen deficiency, known as the “Bombay phenotype” is found in 1 of 10,000 individual in India.
and 1 in 4 million in world. Because the H antigen is the precursor of the ABO blood group antigens, its nonproduction result in absence of ABO blood group antigens. In Bombay, India, an individual was discovered to have an interesting blood type that reacted to other blood types in a way that had not been seen before. Serum from these individual contained antibodies that reacted with all RBCs from normal ABO phenotypes (i.e., groups O, A, B, and AB) and that is why this blood group is known as Bombay blood group. This new character in this blood group is the presence of H antigen and it is the building block for the antigens of the ABO blood group. These individuals produce anti-H, anti-A, and anti-B and can therefore be transfused only with RBCs that also lack H, A, and B antigens. The H antigen is produced by a specific fucosyltransferase. Depending upon a person's ABO blood type, the H antigen is converted into either the A antigen, B antigen, or both. If a person has blood group O, the H antigen remains unmodified. Therefore, the H antigen is present in the highest amounts in blood type O and in the least amounts in blood type AB.

Diminished expression of ABH antigens can occur with variant ABO alleles and in haematological disorders such as leukemia, myeloproliferative disorders, and myelodysplastic syndrome and in some cases of Hodgkin's lymphoma. It has also been found in healthy elderly adults, pregnant females and neonates.

Alteration of ABH antigens in hematologic malignancy was first reported by Van Loghhem et al, who described very weak A antigen expression on the red cells of a patient with acute myeloid leukemia (AML), who had previously shown normal A antigen expression. But in this case patient's serum showed grade 4 reaction to A and B cells on reverse grouping suggestive of Bombay blood group.

Table 1: Serial hematological and biochemical investigations of the patient at private hospital and GCRI

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<td>S. Creatinine</td>
<td>0.9 mg/dl</td>
<td>2.23 mg/dl</td>
<td>1.87 mg/dl</td>
<td>1.41mg/dl</td>
<td>0.9 mg/dl</td>
</tr>
<tr>
<td>Alk.Po4</td>
<td>123 IU/L</td>
<td>114 IU/L</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LDH</td>
<td>-</td>
<td>783 U/L</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Reticulocyte count</td>
<td>-</td>
<td>3.6%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total S. Protein</td>
<td>5.25 gm/dl</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>S. Globulin</td>
<td>2.71 gm/dl</td>
<td>-</td>
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<tr>
<td>S. Albumin</td>
<td>2.54 gm/dl</td>
<td>-</td>
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</table>

Conclusion

Although acute myeloid leukaemia is common in adults but to our knowledge there are only very few reports of AML with Bombay blood group reported yet. Management of AML requires multiple transfusions hence difficulty in determining the correct blood group and unavailability of donors of rare blood groups; makes it difficult to treat them. The diagnostic dilemmas associated with this rare blood group and jaundice also emphasis the importance of screening of patients whose blood group is O positive by routine methods and complete forward and reverse grouping if there is any doubt.

References

Unilateral Proptosis: An Unusual Presentation of Prostate Cancer

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Summary
Adenocarcinoma of prostate typically involves axial skeleton and has been infrequently reported in unusual sites like orbit. Prostatic carcinoma accounts for 8.3% of orbital metastasis and is more likely to present prior to a diagnosis of carcinoma. In this report, we present a case of a patient presenting with unilateral proptosis as the initial symptom of metastatic prostate cancer. While the prognosis is poor with a median survival of less than one year, early identification of tumor is essential to preserve ocular function and initiate therapy. Early recognition and treatment of metastatic disease is crucial for preservation of function and treatment direction.

Keywords: Prostate cancer, Unilateral proptosis, Unusual presentation

Introduction
Unilateral proptosis is rare, but can be the primary presentation of malignant pathology such as orbital metastasis. Up to 13% of orbital tumors are metastatic, and orbital involvement occurs in more than 2% of cancer patients. Orbital symptoms and signs such as proptosis, diplopia, and loss of visual acuity can present before a primary carcinoma up to 25% patients. Evaluation of malignancy in the orbit is an analytical challenge, requires variety of investigations and scrutiny of the broad clinical picture. A study from Northern India conducted by SR Mehdi et al showed prostatic cancer accounts for 25% of bone marrow metastasis.

Case Report
A 66-year-old male presented to the GCRI with one month’s history of progressive unilateral proptosis of right eye associated with double vision, pain and discharge from the same eye since 10 days. He also reported mild to moderate lower backache and weight loss but denied for any urinary complaints. For the same complaints patient was evaluated in private hospital and found to have pancytopenia. MRI brain showed right periorbital soft tissue lesion involving right superior and lateral wall of orbit with extension to right ethmoid sinus, extra ocular muscles and intracranial extension with erosion of floor of right anterior cranial fossa – possibility of malignancy. MRI lumbar spine with whole spine screening revealed altered bone marrow signal intensity in all cervical, dorsal, lumbar, sacral vertebral and pelvic bones with possibility of marrow infiltrating disease. His prior medical history was unremarkable.

On general examination he was conscious and oriented to time, place, and person. His vitals were within normal limit. Liver and spleen were not palpable. On local examination of eye, there was swelling of right eye with chemosis, ecchymosis and discharge from the same eye. There was restriction of extra ocular muscles of right eye in all gazes with grade 1 relative afferent pupillary defect and mild papilledema (Figure 1a, b). Examination of left eye was found to be normal. Cranial nerve examination was normal. Rest of neurological examination was unremarkable.

On laboratory investigation, hemoglobin (Hb) was 6.7 g/dl, total leukocyte count (TLC) was 2.1x10⁹/l, and platelets were 41x10⁹/l. Renal and liver function tests were found to be normal. His serum PSA (Prostate specific antigen) was highly raised (3280 ng/ml) and so also serum LDH to 794.6 u/l. Chest X ray showed generalized increased density of visualized bones with possibility of metastasis. Ultrasound and CT scan of abdomen-pelvis revealed enlarged prostate (4x4.5 cm) with heterogeneous enhancement and enlarged nodes along bilateral common and external iliac vessels. In view of elderly age, anemia and bony involvement, myeloma work up was done which was found to be normal. Due to cytopenia, bone marrow aspiration and trephine biopsy was done which revealed involvement by metastatic adenocarcinoma (Figure 3). Further immunohistochemistry markers were found to be positive for AE1 and PSA suggestive of metastatic adenocarcinoma primarily involving prostate (Figure 4). So he was finally diagnosed as metastatic adenocarcinoma of prostate and bilateral orchiectomy was done by urologist. Scintigraphic whole body bone scan revealed axial skeletal metastasis in multiple cervical, dorsal, lumbar, sacral vertebra, bilateral ribs, scapulae, skull, sternum, pelvis and long bones of both upper and lower limbs. Patient was given palliative
A tumor can aid in the provision of tailored therapy for effective palliation and preservation of sight. It is particularly important in prostatic malignancy, 85% of which is responsive to hormonal therapy.

One of the largest series of eye and orbit metastases reported by Ferry and Font in which the prostate was the site of primary tumor in only 3 cases (1.3%). In yet another series, the same authors found that only between 3.5%-4% of metastatic tumors to the orbit were from prostate primaries. Fredman examined 112 patients (141 eyes) with metastatic tumors of the eyes and orbit and found the breast to be the most common primary site. The prostate was the 5th most common neoplasm to involve the eye in that study.

Metastases to the eye and orbit typically occur through hematogenous spread via the carotid and ophthalmic artery. Genitourinary cancers may access this route via pre-existing pulmonary metastases or through Batson’s plexus. This plexus connects the pelvic veins to the vertebral veins. Tumor cells within the plexus may access the cranial venous sinuses and, subsequently, the ophthalmic veins via changes in venous pressure.

The treatment of prostatic metastases to the eye can involve radiotherapy (30Gy/10 #) to right eye. Patient was given Zolendronic acid intravenous monthly and Bicalutamide 50 mg once daily (antiandrogen therapy). After 15 days of starting treatment, proptosis had been reduced dramatically (Figure 2a, b). PSA levels were fall down to 764.9 ng/ml. Within 1.5 months, patient’s CBC improved (Hb 9.6 g/dl, TLC 4.0x10⁹/l, platelets 159x10⁹/l). After 6 months, there was no proptosis at all, however patient developed urinary tract infection with deranged renal function tests (Creatinine 3.06 mg/dl) at the same time (08/09/2017) with normal CBC (Hb 9.0 g/dl, TLC 5.2x10⁹/l, platelets 190x10⁹/l) but unfortunately patient was lost to follow up.

Discussion
In this case, an unusual presentation of metastatic prostatic adenocarcinoma emphasizes the importance of a comprehensive history and clinical assessment in a man presenting with unilateral proptosis. Prostatic carcinoma accounts for 8.3% of orbital metastasis and is more likely to present prior to a diagnosis of carcinoma. Prognosis of orbital metastasis is poor, with a median survival of just over a year. Early and prompt diagnosis of the primary tumor can aid in the provision of tailored therapy for effective palliation and preservation of sight. It is particularly important in prostatic malignancy, 85% of which is responsive to hormonal therapy.

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Metastases to the eye and orbit typically occur through hematogenous spread via the carotid and ophthalmic artery. Genitourinary cancers may access this route via pre-existing pulmonary metastases or through Batson’s plexus. This valve less venous plexus connects the pelvic veins to the vertebral veins. Tumor cells within the plexus may access the cranial venous sinuses and, subsequently, the ophthalmic veins via changes in venous pressure.

The treatment of prostatic metastases to the...
orbit is palliative and does not alter survival. Androgen ablation is the preferred treatment if the patient is hormone-naive. Local radiation therapy is also an effective alternative and has been used for palliation of symptoms in some cases. However, the study done by Park JC et al, concluded that current data support the use of upfront combined chemotherapy (Docetaxel) and androgen deprivation therapy (ADT) in properly selected patients with metastatic disease but not non metastatic/high-risk disease. However, in our case, we treated patient with bilateral orchiectomy and ADT (Bicalutamide) with Zolendronic acid monthly for bony metastasis, as patient was not willing for aggressive chemotherapy.

Conclusion
In an older male with visual complaints and urinary symptoms, the genitourinary system should be evaluated as a potential primary site as prostate cancer is one of the main sources of orbital metastases. Although prognosis is generally poor, both local and systemic treatment options exist to address symptoms and preserve visual acuity. Mainstays of treatment include androgen deprivation therapy and palliative radiotherapy with an expanding role for chemotherapy as recent studies suggest promising outcomes with upfront chemotherapy for metastatic prostate cancer. Early recognition and treatment of metastatic disease is crucial for preservation of function and treatment direction.

References
Oncoorthocon 2018 was a unique international orthopedic oncology conference organized by Gujarat Cancer Research Institute (GCRI) on 4-5 th August 2018. The scientific program covered a wide variety of subjects in the field of Orthopedic Onco Surgery including recent advances in Bone and Soft Tissue tumors. (Figures 1, 2) There was workshop on Live Operative sessions i.e. Bone Biopsy & Saw Bone workshop of megaprostheses. The organizing committee worked hard to put on a high quality meeting which will provide an ideal blend of education and socialization. The key highlight of this conference was plenary lecture by Prof. Shekhar Kumta (Professor and Vice Dean Hong Kong National University) on Computer Aided Tumor Surgery (CATS). A unique felicitation of two bone tumor warrior patients was performed during this conference that included a patient with expandable total femur replacement and another with hemipelvectomy. This conference had lectures by more than 20 national orthopedic onco-surgery faculties. This conference had over 120 national and international delegates. There were 5 oral presentations and 16 e poster presentation during this conference. Summary of oral presentations is as follows.

1. Impact of Various Demographic and Clinicopathological Variables on Survival in Extremity Soft Tissue Synovial Sarcoma: A Single Centre Experience

Singh Ashok Kumar, Parmar Rahul, Merja Manthan, Salunke Abhijeet, Shah Jaymin
Gujarat Cancer & Research Institute, Ahmedabad, India

Introduction

Synovial sarcoma is a high-grade soft tissue sarcoma with three histological subtypes (monophasic, biphasic and poorly differentiated) that are characterized by variable degree of spindle and epithelial cell differentiation. The aim of present study is to evaluate the impact of various demographic and clinicopathological variables on survival.

Material and Methods

This Retrospective Longitudinal study was conducted at GCRI Ahmedabad. Total 46 patients were included in the study operated between August 2010 and August 2017. The diagnosis of all cases was confirmed by Tissue biopsy and immunohistochemical staining. Follow up data was collected till May 2018. Magnetic resonance imaging (MRI) was routinely performed for the initial assessment of the primary tumor, CECT thorax, abdomen and pelvis to rule out metastatic disease. Follow up surveillance was done by history and physical examination, USG or MRI local part as indicated and CECT thorax every 3-6 month.

Results

46 patients of synovial sarcoma operated in time period between August 2010 to August 2017, 29 were male with median age of 21 (7-70) year and 17 were female with Median age of 35 (13-50) year. Most common site for disease was lower extremity. On histological subtyping 41.3% (19/46) were monophasic, 23.9% (11/46) were biphasic, 23.9% (11/46) were poorly differentiated and in 10.9% (5/46) histological subtyping was not performed. On immunohistochemical staining CD-99 and Vimentin stained positive in 100% cases, BCL2 Positive in 94.2% cases and Desmin stained negative in 100%. Four patients have stage IV disease at presentation; all had lung metastasis and primary tumor size > 5.0 cm and poor differentiation on histology.

26.08% (12/46) patients received neoadjuvant chemotherapy, most common regimen used was ifosfamide and Adriamycin (I+E) based chemotherapy. The median DFS and OS in NACT vs NO NACT group was (28.5 vs 21) and (37.5 vs 24) months which shows trend towards improved DFS and OS in NACT group but it was not statistically significant (p>0.05).

Most common surgery performed was wide excision with or without reconstruction in 60.8% (28/46) of patients while major amputation needed in 39.2% (18/46) of patients. 43 patients had R0 resection while 3 patients had R1 (microscopic positive margin) resection, 65.2% (30/46) of patients received adjuvant treatment.

41.2% (19/46) patients given PORT only while 24% (11/46) patients received post op chemoradiation. Patients who had given adjuvant treatment had improved median DFS and OS 29 and 37 months, as compared to those without adjuvant treatment 11.5 and 29 months. The 5 year DFS and OS is also improved (p<0.05).

41.3% (19/46) patients had disease relapse, median time to relapse after surgery was 14 months. 17 patients had relapse in lung only while two patients had lung, bone and local site relapse. On final evaluation 50% (23/46) patients were alive and disease free, 17.4% (8/46) patients alive with metastatic disease and 32.6% (15/46) patients expired either due to either systemic recurrence or metastatic disease. In the present study older age, advanced stage, poor tumor differentiation, and metastatic disease at presentation is risk factors for poor survival. Clinical tumor size and gender had no correlation with survival in the present study.
Conclusion
Synovial sarcoma is a high-grade soft tissue sarcoma. Chromosomal translocation study and specific immunohistochemical markers needed for the diagnosis. It occurs most frequently in the lower extremities. Local control either with surgery alone in small tumors at good prognostic sites may be enough. Radiation, as well, is usually required for those with larger tumors. Our study showed that older age, advanced stage, poor tumor differentiation, and metastatic disease at presentation are risk factors for poor survival. Use of adjuvant radiotherapy or adjuvant chemoradiation is associated with significantly improved DFS and OS.

2. Extracorporeal Irradiation in Management of Primary Bone Tumors- An Institutional Experience
Patel Sonal, Suryanarayan U, Poddar Jyoti, Shah Jaymin, Salunke Abhijeet, Pelagade Satish
Gujarat Cancer & Research Institute, Ahmedabad, India

Introduction
Primary bone tumor, which has made limb salvage possible. It consists of en-bloc removal of the tumor bearing bone segment, removal of the tumor from the bone, irradiation and reimplantation of the Extracorporeal Irradiation (ECI) is a relatively newer method of delivering radiation in patients of bone.

Material and Methods
From year 2014 to 2016, six patients with primary bone tumor were enrolled. Four patients were of Ewings sarcoma (ES) and two of Osteosarcoma (OS). The eligibility criteria included histopathological proof of malignancy, no evidence of distant metastases at the time of surgery, and suitability for limb preservation therapy. Surgery was performed about 4 weeks after completion of neoadjuvant chemotherapy. The affected bone segment was resected, irradiated extracorporeally with a dose of 50 Gray and re-implanted. Local control and complications was studied.

Results
Out of the six patients treated so far, none of them developed local recurrence at the median follow up of 11 months. One patient developed systemic metastasis and one developed chemotherapy related complications during adjuvant chemotherapy.

Conclusion
Results of our study suggest that ECI is technically feasible in the management of Primary bone tumors and provides decent local control with no complications. A larger study with more number of patients and longer follow up is required to draw further conclusions.

3. Total en Bloc Excision of Primary Tumours of the Spine
Deogaonkar Kedar, Murad Lala, Agrawal Manish
Hinduja Hospital, Mumbai, India

Introduction
Primary bone tumours of the spine account for 11% of all the primary musculoskeletal tumours. Surgery in the form of intrallesional excision is associated with tumour contamination and a high local recurrence rate. En bloc resections are procedures aimed at surgically removing tumours with normal tissue margin. Local control achieved by means of en-bloc resection rise to 82% as compared to 0% when an intralesional surgery is performed.

Material and Methods
To evaluate the approach, efficacy, perioperative morbidity and outcomes of en bloc excision of 4 cases of primary spine tumours. We present 4 cases of primary spine tumours operated at PD Hinduja Hospital, Mumbai, from January 2015 to March 2017. Three of these were chondrosarcomas and one was a chordoma. The chordoma involved the lumbar spine. Two chondrosarcomas involved the thoracic spine and one chondrosarcoma involved the sacrum. The 2 cases of thoracic chondrosarcomas were treated by en bloc tumour excision through an “all posterior” approach. The sacral chondrosarcoma was treated by total sacrectomy, extracorporeal radiation therapy (ECRT), reimplantation and lumbopelvic fixation. L5 chordoma was treated by a total en bloc spondylectomy (TES) by a combined anterior and posterior approach. All cases were followed up for a minimum period of 12 months.
Results
Of the 4 patients, 3 were males and 1 was a female. Mean age of the study group was 42 years. Average duration of surgery was 12 hours. Average blood loss during surgery was 4.3 litres. Average duration of post op ICU care was 42 hours. None of the patients developed neurological deficits postoperatively. No major perioperative complications were noted. There were no cases of local recurrences or metastasis at average follow up of 13 months.

Conclusion
Keeping in mind the varied and complex anatomy of the spine, meticulous planning by a multidisciplinary team of surgeons is necessary for a successful surgical and oncologic outcome. In carefully selected patients, total enbloc excision with disease free margins can be safely executed with minimum morbidity, providing for prolonged survival and possible cure in primary spine tumours.

4. Clinical outcome of monostotic fibrous dysplasia over proximal femur treated with intramedullary nailing and bisphosphonate therapy. Sau Saikat, Sabui Kanchan Kumar Medical College, Kolkatta, India

Introduction
Fibrous dysplasia of bone is an enigma with no proper guideline. Treatment currently consists of curettage and bone-grafting in an attempt to eradicate the lesion and to prevent progressive deformity. No definite criteria have been established to identify patients at high risk of presenting pathological fractures. Clear guidelines for orthopaedic management of fibrous. In the current study, the combination bisphosphonate therapy diminished pain, prevented fractures, lowered NTelopeptide values, and led to partial resolution of fibrous dysplasia lesions.

Material and Methods
At Medical College Kolkata, Ten patients with monostotic fibrous dysplasia in lower extremities treated between 2015 to 2018 were included in the study. All patient’s underwent full skeletal survey followed by core needle biopsy with the help of MRI and C-ARM guidance, after confirmation, closed intramedullary nail without reaming was used in all cases. Bone grafting was not performed. Zoledronic acid, given intravenously at the dose of 4 mg every 6 months. Patients were allowed full weight bearing on the affected extremities on the second postoperative day.

Result
Seven patients were female and 3 were male; their mean age was 26.9 years. The mean duration of follow-up was 30.5 months. We get good to average results. Clinico-radiological improvement of all cases.

Conclusion
As a result of this study, we believe intramedullary fixation can be performed successfully. In cases of monostotic fibrous dysplasia with adjuvant bisphosphonate therapy proven increase function activity and control pain. This will avoid problems that may occur following pathological fractures.

5. Change in paradigm for denosumab therapy in GCT: A single institution experience of 124 cases HP Suraj, Chinder Pramod HCG Cancer Hospital, Banglore, India

Introduction
Giant cell tumour (GCT) of the bone is a commonly encountered aggressive benign tumour. Denosumab a RANKL inhibitor has gained popularity in halting the osteolysis in RANKL pathway and hence been used extensively in cases of GCT over the past few years. We evaluated the effect of various regimens of denosumab on GCT and the rate of recurrence following curettage of lesion in patients treated with neoadjuvant denosumab therapy.

Material and Methods
124 cases of GCT (59 proximal tibia, 43 distal femur, 8 pelvis, 6 distal radius, 5 hand and foot, 1 talus, 1 distal tibia and 1 proximal humerus) treated by denosumab, followed by extended curettage were analysed retrospectively. Histological, radiological and modified musculoskeletal tumour society (MSTS) scoring were analysed before and after administering various regimens of 120 mg of Inj. Denosumab subcutaneously. Rate of recurrence on follow-up was compared with the rate of recurrence in patients with 57 cases of GCT operated without denosumab.

Result
Following denosumab therapy, 95.96% (n=119) patients had improved functional outcome as evidenced by a mean MSTS score improvement of 63.2% and there was no significant difference in improvement of MSTS score, in patients receiving <=3 doses (group1, n=69) and >3 doses (group2, n=55) of denosumab (p=0.142). There was also no difference in improvement of radiological outcome (p=0.436) as 91.3% (n=63) of the patients in group1 showed improvement by at least one Campanacci grade on x-ray when compared to 92.7% (n=51) of patients in group2. On follow-up for a median time of 21.4 months, 24.3% of patients operated following denosumab therapy had recurrence of tumour, when compared to 9.8% of patients without denosumab therapy (p=0.012).

Conclusion
The effect of Denosumab of GCT can be achieved with reduced number of doses. Denosumab has to be used cautiously in selected cases with a personalized treatment strategy as it can lead to increased chances of tumour recurrence.
Summaries of Presentations at Clinical Meetings

Should the Appendix Always be Removed During Surgery for Mucinous Ovarian Tumors?

Garg Sonal S
Gynaecological Oncology

Summary
Appendectomy is performed in all mucinous ovarian tumors (MOT) identified intraoperatively to ensure microscopic metastases from appendix are not missed. Several recent studies suggested that appendectomy should only be performed in cases with a grossly abnormal appendix or with evidence of pseudomyxomaperitonei. Our study aimed to determine the frequency of malignancy in a grossly normal appendix in women undergoing surgery for borderline or malignant MOT. In a single institution retrospective study, women undergoing surgery for MOT from January 1, 2008 to June 30, 2016 were included. Women with benign MOT, those with a history of either prior appendicectomy or prior gastrointestinal (GI) malignancy were excluded. Of 266 women identified with MOT, 153 with borderline and malignant MOT were included in the study after application of inclusion criteria. The study population comprised of 29(18.95%) borderline and 124(81.05%) malignant MOT. Among the borderline MOT, 13/29 had undergone appendectomy. Five (38.46%) had grossly abnormal appendices of whom 1 had mucinous cystadenoma, 3 had borderline mucinous tumor and 1 had mucinous cystadenocarcinoma of the appendix. Histology was normal in all 8(61.54%) grossly normal appendices. Among the malignant MOT, 80/124(64.52%) underwent appendicectomy. Nineteen (23.46%) had grossly abnormal appendices and histology was suggestive of adenocarcinoma of appendix. Histology was normal in all 62(76.54%) macroscopically normal appendices. Our results suggest that appendectomy be performed only for those appendices that are grossly abnormal or associated with pseudomyxomaperitonei at surgery for MOT.

Risk of Clinically Significant Prostate Cancer Associated with Prostate Imaging Reporting and Data System Category 3 (Equivocal) Lesions Identified on Multiparametric Prostate MRI

Makwana Kushal
Radio-diagnosis

Summary
Multiparametric MRI is useful in deciding PI-RADS category 3 (equivocal) lesions prospectively identified on multiparametric prostate MRI and to identify risk factors (RFs) for CSC that may aid in decision making. This study shows incorporation of clinical parameters into risk stratification algorithms may improve the ability to detect clinically significant disease among PI-RADS category 3 lesions and may aid in the decision to perform biopsy. Although PI-RADSv2, currently represents the most up-to-date information on how to acquire and interpret results of multiparametric prostate MRI, still the categorization and management of PI-RADS category 3 lesions remains inexact and challenging. In future similar type of studies with larger sample size can help in deciding whether this parameters inclusion really affects the PI-RADS staging or not.

Controversies and Concensus in Preoperative Therapy of Esophageal and Gastroesophageal Junction Cancers

Kumar Sharath
Surgical Oncology

Summary
Esophageal cancer is unique among the gastrointestinal tract malignancies because it embodies two distinct histopathologic types: squamous cell carcinoma and adenocarcinoma. For locally advanced esophageal cancer, surgery remains the mainstay of treatment. Numerous studies have evaluated preoperative and postoperative strategies for locally advanced diseases, including chemotherapy or chemoradiation, these studies show that some treatment in addition to surgery clearly improves outcomes. This review article discusses these studies in detail and consensus concluded at the end. Most noted study which need special mention are, for evaluation of preoperative chemotherapy is MAGIC TRIAL, for evaluation preoperative chemoradiation study is Dutch CROSS TRIAL, comparision between preoperative chemotherapy versus preoperative chemoradiation in German POET TRIAL, and role of definitive chemoradiation without surgery is ACCORD 17 TRIAL, and role of PET directed therapy in German MUNICON TRIAL. To summarize, Esophageal cancer remains a significant health problem with most patient presenting with advanced disease with adenocarcinoma emerging epidemic in western countries but squamous cell carcinoma still most common histology diagnosed in south east Asia including India. Completed phase III studies now show clear improvements in outcomes in patients who
of Spinal metastasis.

plasmacytoma) can give new insight, for management survival (breast, prostate, lymphoma & metastatic undifferentiated tumor) and long term prospective trial for short term survival (lung cancer rehabilitation of the paraplegic patients. However neurological outcome and early ambulation for years has defiantly good results with improvement in quality of life. Pedicle screw fixation done in recent (Mechanical, Radicular and local), and improving stabilizing and improving neurology, Relief of pain terminal events. Surgery has definite role in improvement oncological outcome. Analysis of clinical data of 180 patients operated for MSCC from 1999 to 2017 at Neuro-onco department. The clinical radiological, surgical treatment details and followup & outcome were analyzed. Frankel grading system was utilized to compare clinical results pre and postoperatively. In conclusion MSCC cases are not terminal events. Surgery has definite role in stabilizing and improving neurology. Relief of pain (Mechanical, Radicular and local), and improving quality of life. Pedicle screw fixation done in recent years has defiantly good results with improvement in neurological outcome and early ambulation for rehabilitation of the paraplegic patients. However prospective trial for short term survival (lung cancer & metastatic undifferentiated tumor) and long term survival (breast, prostate, lymphoma & plasmacytoma) can give new insight, for management of Spinal metastasis.

Neuro-oncology

Summary
Metastatic Spinal Cord Compression (MSCC) is defined as compression of dural sac and its contents by extradural mass. Metastasis spinal diseases are increasing as patients survive longer due to improved oncological outcome. Analysis of clinical data of 180 patients operated for MSCC from 1999 to 2017 at Neuro-onco department. The clinical radiological, surgical treatment details and followup & outcome were analyzed. Frankel grading system was utilized to compare clinical results pre and postoperatively. In conclusion MSCC cases are not terminal events. Surgery has definite role in stabilizing and improving neurology. Relief of pain (Mechanical, Radicular and local), and improving quality of life. Pedicle screw fixation done in recent years has defiantly good results with improvement in neurological outcome and early ambulation for rehabilitation of the paraplegic patients. However prospective trial for short term survival (lung cancer & metastatic undifferentiated tumor) and long term survival (breast, prostate, lymphoma & plasmacytoma) can give new insight, for management of Spinal metastasis.

Maxillofacial Prostheses Post- Head & Neck Resections
Parmar Chaitanya
Dental OPD
Summary
Maxillofacial prosthetic rehabilitation is an integral part of a comprehensive treatment planning for patients undergoing surgical resection of head and neck cancers. The common goals for rehabilitation are restoration of speech, mastication, swallowing, control of saliva, esthetics and restoration of facial deficits. Preoperative communication and discussion between the head and neck oncosurgeon and the prosthodontist is crucial for optimal planning and achievement of a good functional and esthetic outcome at various stages of treatment. Head and Neck Oncosurgeon should be aware of the functional
sequelae from loss of structures being resected so that patient's rehabilitation is planned even before the surgical procedure is undertaken.

**Low level laser Therapy for Radiotherapy Induced Oral Mucositis.**
Shah Vibhuti
Physiotherapy

**Summary**
Head & neck cancer is 6th leading cancer worldwide. Oral Mucositis is one of the most frequent complications seen due to treatment of head and neck cancer. This study is conducted to evaluate the effect of – the role of LLLT for radiotherapy induced oral mucositis. Methodology: 80 patients (40 laser group & 40 non laser groups) were selected for this study. Pain was studied in laser group on 1st, 7th & 15th day of laser therapy. Both group assessed for grade of mucositis on the last day of laser therapy. Incidence of pain and severity of oral mucositis were reduced who had received laser therapy. we concluded that laser therapy has definite role in radiotherapy induced oral mucositis.

**Expression Pattern of Antigens on Leukemic Blasts Predict BCR/ABL1 Gene Rearrangement in B-cell Acute Lymphoblastic Leukemia**
Raiya Birva
Immunohematology

**Summary**
Philadelphia chromosome (Ph) is the most common cytogenetic abnormality in adult acute B lymphoblastic leukemia with a global incidence of 20-30%. Ph-positive B-ALL is an aggressive disease with a frequent resistance to chemotherapy treatment and a short survival rate. Introduction of specific inhibitors of the BCR/ABL1 tyrosine kinase, has improved the prognosis of Ph-positive ALL patients. The aim of the present study was to determine a pattern of antigens associated with BCR/ABL1 gene rearrangement and to propose a predictive model based on immunophenotypic expressions observed at the disease onset. We performed a retrospective analysis of 120 patients with B-ALL diagnosed at GCRI by a flowcytometric assessment. Immunophenotypic expression of leukemic blasts was explored by evaluation of median fluorescence intensity (MFI). Presence of BCR/ABL1 fusion was assessed by FISH analysis. BCR/ABL1 fusion was observed in one fourth of cases. BCR/ABL1 gene rearrangement was found high in younger age group (54%) as compared to older age group (27%) and pediatric (18%). All patients with BCR/ABL1 gene rearrangement were positive for CD10 and Tdt. BCR/ABL1-positive cases exhibited a greater MFI value of CD10, CD34, Tdt, CD13, CD33, but a lower median percentage and MFI values of CD22, CD79a as compared to BCR/ABL negative cases. Multivariate logistic regression analysis showed that CD10, CD38 and CD13 expressions were independent predictors for the presence of BCR/ABL1 rearrangement. CD10, CD13 and Tdt expressions are the most informative immunophenotypic markers for the presence or absence of gene rearrangement.

**Comparison of Biologic Methods of Reconstruction in Intercalary Excision of Femoral Diaphyseal Tumors: What are the Outcomes?**
Salunke Abhijeet Ashok
Orthopedic Oncology

**Summary**
The aim of the study was to compare biologic (non vascularized fibula grafts and extra corporeal irradiated autologous bone grafts) methods used for reconstruction of intercalary defects after resection of femoral diaphyseal tumors. The study includes 28 patients who had undergone intercalary resection in femoral diaphyseal tumors between 2011 and 2016. The mean follow-up period was 24 months (range, 12-57 months). The mean union time for diaphyseo-diaphyseal union was 10.5 and 11 months in non-vascularized fibula and ECRT group respectively. The mean union time for metaphyseo-diaphyseal union was 6.5 and 6.5 months in non vascularized fibula and ECRT group respectively. 06 patients had distant metastasis and one patient had local recurrence. The mean MSTS score was 28 at last follow-up. 2 patients had surgical site infection (2 nonvascularized fibula group). Implant failure was seen in one patient of ECRT group requiring revision surgery. 3 patients had nonunion (2 nonvascularized fibula, 1 ECRT). Non vascularized fibula and ECRT treated autografts reconstruction provides good results and union timing are comparable. The reconstruction method depends upon the resources available at the oncologic centre and the conversance of method of treating surgeon.
## Presentations at the Clinical Meetings

*(January 2018 to June 2018)*

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Date</th>
<th>Speaker/Department</th>
<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>10.02.2018</td>
<td>Garg Sonal S Gynaecological Oncology</td>
<td>Should the Appendix always be Removed during Surgery for Mucinous Ovarian Tumors?</td>
</tr>
<tr>
<td>2</td>
<td>24.02.2018</td>
<td>Makwana Kushal Radio-diagnosis</td>
<td>Risk of Clinically Significant Prostate Cancer Associated with Prostate Imaging Reporting and Data System Category 3 (Equivocal) Lesions Identified on Multiparametric Prostate MRI</td>
</tr>
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<td>3</td>
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<td>Controversies and Consensus in Preoperative Therapy of Esophageal and Gastroesophageal Junction Cancers</td>
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<td>5</td>
<td>28.04.2018</td>
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<td>Surgical Management of Squamous Cell Carcinoma of Maxillary Sinus: A Retrospective Study</td>
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<td>6</td>
<td>12.05.2018</td>
<td>Parmar Chaitanya Dental OPD</td>
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<td>7</td>
<td>26.05.2018</td>
<td>Shah Vibhuti Physiotherapy</td>
<td>Low Level Laser Therapy for Radiotherapy Induced Oral Mucositis</td>
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<td>09.06.2018</td>
<td>Raiya Birva Immunohematology</td>
<td>Expression Pattern of Antigens on Leukemic Blasts Predict BCR/ABL1 Gene Rearrangement in B-cell Acute Lymphoblastic Leukemia</td>
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<td>Salunke Abhijeet A Orthopedic Oncology</td>
<td>Comparison of Biologic Methods of Reconstruction in Intercalary Excision of Femoral Diaphyseal Tumors: What are the Outcomes?</td>
</tr>
</tbody>
</table>
## Case Presentations for Morbidity, Mortality at Clinical Meetings

(January 2018 to June 2018)

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<th>Presenter/Department</th>
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<tbody>
<tr>
<td>1</td>
<td>24.02.2018</td>
<td>Patel Twinkal Anesthesiology</td>
<td>Morbidity and Mortality Data Presentation of Surgical and Medical Departments</td>
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<tr>
<td>2</td>
<td>24.02.2018</td>
<td>Patel Akash Medical Oncology</td>
<td>Management of case of Pediatric APML with stroke</td>
</tr>
<tr>
<td>3</td>
<td>24.03.2018</td>
<td>Rathod Mohit Anesthesiology</td>
<td>Morbidity and Mortality Data Presentation of Surgical and Medical Departments</td>
</tr>
<tr>
<td>4</td>
<td>24.03.2018</td>
<td>Kumar Sharath Surgical Oncology</td>
<td>Controversies and Consensus in Preoperative Therapy of Esophageal and Gastroesophageal Junction Cancers</td>
</tr>
<tr>
<td>5</td>
<td>28.04.2018</td>
<td>Patel Twinkal Anesthesiology</td>
<td>Morbidity and Mortality Data Presentation of Surgical and Medical Departments</td>
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<td>6</td>
<td>28.04.2018</td>
<td>Rohit Arun Anesthesiology</td>
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<td>7</td>
<td>23.06.2018</td>
<td>Rushit Medical Oncology</td>
<td>Association of immunotherapy with durable survival as defined by value framework for cancer care</td>
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<tr>
<td>8</td>
<td>23.06.2018</td>
<td>Rathod Mohit Anesthesiology</td>
<td>Morbidity and Mortality Data Presentation of Surgical and Medical Departments</td>
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### Journal Club/Guest Lecture/Review Lecture Presentations

**(January 2018 to June 2018)**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Date</th>
<th>Presenter/Department</th>
<th>Topic</th>
<th>Authors</th>
<th>Citation</th>
</tr>
</thead>
</table>
The following documents are required for each submission:

- Title Page (Font size: 12)
- Title of manuscript (Font size: 16)
- Summary and Keywords (Font size: 9)
- Text (Introduction, Aims and Objectives, Materials and Methods, Results and Analysis, Discussion with Conclusions; Font size: 12).
- Tables (separate page, Number Arabic numerals (e.g. 1,2,3) as it comes in results) (Font size: 12)
- Figures and Illustration (separate page, JPEG format, Number Arabic numerals (e.g. 1, 2,3) as in results, if photographs of persons are used, the subjects or patients must not be identifiable).
- Legends to Figures and Illustration: Present the legends for illustrations separate page using double-spacing, with Arabic numerals corresponding to the Illustrations. (Font size: 12)
- References (separate page, Number references consecutively in the order in which they are first mentioned in the text. Identify references in the text in numerals in superscript and parenthesis; Font size: 12).
- Acknowledgement (Font size: 9)

Units and abbreviations

Avoid abbreviations in the title and abstract. All unusual abbreviations should be fully explained at their first occurrence in the text. All measurements should be expressed in SI units. Drug names Generic drug names should be used.

Abbreviations of units should conform to those shown below:

- Decilitre  dl
- Kilogram  kg
- Milligram  mg
- Hours  h
- Micrometer  mm
- Minutes  min
- Molar  mol/L
- Millilitre  ml
- Percent  %

**Title Page**

The title page should include:

1. Type of manuscript (article/case report)
2. The title of the article, which should be concise, but informative; (Title case, not ALL CAPITALS, not underlined)
3. The name by which each contributor is known (Last name, First name and initials of middle name), with institutional affiliation;
4. The name of the department(s) and institution(s) to which the work should be attributed;
5. The name, address, phone numbers and e-mail address of the contributor responsible
6. The total number of pages and total number of photographs
7. Source(s) of support in the form of grants, equipment, etc
8. 3-8 keywords

**Language and grammar**

- Uniformly American English
- Abbreviations spelt out in full for the first time
Summary and Keywords: Summary no more than 250 (150 for Case Report) words. Should have following headings: Introduction (state the purposes of the study or investigation), Materials and Methods (selection of study subjects/patients, observational and analytical methods), Results (give specific data and their statistical significance, where ever possible), and Conclusion (succinct emphasis of new and important aspects of the study or observations). Do not use symbols in the summary; rather, spell out what they stand for in full. Three to eight keywords must be included below the summary.

Text: This should consist of Introduction (including Aims and Objectives), Materials and Methods, Results, Discussion with Conclusions. Cite every Reference, Figures and Tables mentioned in the text in Arabic numerals (e.g. 1,2,3).

Introduction/Aims and Objective: State the purpose of the article. Summarize the rationale for the study or observation. Give only strictly pertinent information and references, and do not review the subject extensively. Do not include data or conclusions from the work being reported.

Materials and Methods: Describe precisely your selection of the observational or experimental subjects (patients, including controls). Identify the methods, apparatus (including manufacturer’s name and address in parenthesis), and procedures in sufficient detail to allow others to reproduce the method. Give references to established methods, including statistical methods; provide references and brief descriptions for methods that have been published but are not well-known. For new or substantially-modified methods, describe and give reasons for using them and evaluate their limitations.

Identify precisely all drugs and chemicals used, including their generic names, their manufacturer’s name, city and country in parenthesis, doses, and routes of administration.

Results: Present your results in a logical sequence in the text, Tables, and Illustrations. Do not repeat in the text all the data in the Tables or Illustrations. Emphasize or summaries only important observations. Specify the statistical methods used to analyze the data. Restrict Tables and Illustrations to those needed to explain the argument of the paper and to assess its support. Where possible, use Graphs as an alternative to Tables with many entries. Do not duplicate data in Graphs and Tables.

Discussion: Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or the Results section. Include in the Discussion section the implications of the findings and their limitations, including the implications for future research. Relate the observations to other relevant studies.

Tables: Print each Table double-spaced on a separate sheet. Number Tables consecutively in Arabic numerals (e.g. 1, 2, 3) in the order of their first citation in the text and supply a brief title, which should be shown at the top of each table.

Illustrations (Figures) and Legends for Illustrations: All Illustrations must be submitted in JPEG finished format that is ready for reproduction. Figures should be numbered consecutively in Arabic numerals (e.g. Figure 1, 2, 3) according to the order in which they have been first cited in the text. If photographs of persons are used, the subjects or patients must not be identifiable. Present the legends for illustrations using double-spacing, with Arabic numerals corresponding to the Illustrations.

Acknowledgements: State contributions that need to be acknowledged.

References
A list of all the references cited in the text should be given at the end of the manuscript and should be numbered consecutively in the order in which they are first mentioned in the text. Identify references in the text by Arabic numerals in superscript. Omit month and issue number. List all authors, but if the number is six or more, list first three followed by et al. The references should be cited according to the Vancouver agreement. Authors must check and ensure the accuracy of all references cited. Abbreviations of titles of medical periodicals should conform to the latest edition of Index Medicus. Some examples are shown below:

Standard Journal

Online journal article

Chapter in a book

Online book or website

In press

Referees
Generally, submitted manuscripts are sent to one experienced referee from our panel. The contributor’s may submit names of two qualified reviewers who have had experience in the subject of the submitted manuscript, but not associated with the same institution(s) as contributors nor have published manuscripts with the contributors in the past 10 years.
Educational Graphics and Medical Photography

Patel Rushi,
Chief Photography & Publicity
Gujarat Cancer and Research Institute

Introduction:
Visual impact and pictorial presentation always attracts the viewers and it can also has long lasting impression in the mind of viewers.

The department of Educational graphics and Medical photography was established since inception of the institute. Ever since it's inception department has witnessed almost all the activities through lens of the camera.

The aim of this department is to prepare all the oncology related photography and graphics available, which might be helpful to the institute academically as well as in the management of patient.

We also prepare attractive and understandable community awareness material.

Activities:

Photography:
Department has Nikon D700 DSLR Camera which is being used for academic and institutional Activities.

- **Patient Photography:** For Unique types of cancer cases and also for doctors for their articles and paper presentations
- **Operation theatre Photography:** For demonstration of operative techniques and rare presentations of cancer. These photographs are used by faculties for teaching & conference presentations.
- **Event Photography:** Awareness Programmes, Conferences, Different Day Celebrations
- **Other Photography:** Construction Activities of the Institute and various instruments of hospitals

Designing & Graphics:
Department has profession softwares like Coreldraw Graphics Suit 2017, Adobe Photoshop and MS Office for prepare all graphics and designs which is being used for academic and institutional Activities.

- Annual Report of GCRI & GCS
- Biannual GCS Journal
- Registry Reports
- Certificates for various courses run by institute Fellowship, Apprentice, CMRT, CMLT courses
- Also design certificates for Events, Conferences, Employee of the Month, Day Celebrations
- Banner Design for events, day celebrations, Institute instructions
- ID cards & Library ID cards for hospital employees
- Various forms and hospital stationary
- Cancer Awareness Posters & brochures

Printing:
Department has HP Color Laserjet Printer CP5225 and HP Color Laserjet Printer CP2025 which is being used for academic and institutional activities. upto A3 size printing

For Institutional Website:
The department plays an important role in catering all the needs of Photographs and Graphic Updates of the institute for the purpose of clinical, educational and public awareness activities for GCRI's website.

![Figure 1: Nikon D 700 Camera with Nikon SB 900 flash](image)

![Figure 2: HP Color Laserjet CP 5225 Printer](image)
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General information about Cancer

What is cancer?
A cell is the main unit of our body. The human body is comprised of millions of such cells. These cells are divided systematically. The symmetrical division of the cells leads to normal development of all the organs. But some external factors or internal defects can break this rhythm of the growth and division of cells. Thus, the uncontrolled growth of the cells is seen as a tumor or an ulcer in the body. This tumor or ulcer is called cancer.

Blood cancer does not show any tumor or ulcer because its cells are mixed in blood and spread to the body. More than 100 different types of cancer are known.

Cancer scenario in India:
At present, the cancer rate in India is estimated to be 70-90 in every one lakh population. Currently there are approximately 24 lakh cases of cancer in India, and another 10 lakh patients are added every year. Tobacco

How to quit tobacco?
Most of the people using tobacco want to quit this habit and many of them end up with unsuccessful attempts. But here are a few suggestions which could be helpful in quitting tobacco.

Whenever you are planning to quit tobacco, be ready to change your habit as well as your thinking. Most of the tobacco consumer thinks that: they can not have

Oral Cancer

This cancer occurs in the tissues of the oral cavity or the oropharynx. They include cancers of the lips, tongue, cheek, gums, and throat. In 2012, there were about 7,00,000 new cases of cancers diagnosed in India out of which tobacco related cancers were about 3,00,000.

Who is at risk?
- People with age more than 40 years
- Smokers and tobacco users
- Heavy alcohol users
- Men are three times higher risk than women

Breast Cancer

The breasts:
The breasts are made up of fat, supportive tissue and glandular tissue that contains lobes. The lobes (milk glands) are where breast milk is produced.

Breast cancer starts when cells in the breast begin to divide and grow in an abnormal way and become cancerous.

Cervical Cancer

Cervix is the lower part of the uterus (womb) which connects the body of the uterus to the vagina (birth canal). The fetus grows in the body of the uterus (the upper part).
Educational Graphics & Medical Photography Department Services at GCRI

Clinical Photography of Patient

Designing of Gujarat Cancer Society Research Journal

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