Online ISSN: 2249-4618
Print ISSN: 0975-5888

Global Journal of Medical Research: D

Radiology, Diagnostic Imaging and Instrumentation

Highlights

- Ultrasound Diagnosis
- Conservative Surgery
- Intestinal Ascariasis
- Report and Literature

Discovering Thoughts, Inventing Future

VOLUME 14 ISSUE 1 VERSION 1.0

Global Journal of Medical Research: D
Radiology, Diagnostic, Imaging and Instrumentation

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Radiology, Diagnostic, Imaging and Instrumentation
Volume 14 Issue 1 (Ver. 1.0)

Open Association of Research Society

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USA Tax ID: 98-0673427

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Packaging & Continental Dispatching

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Global Journal of Medical research: D
Radiology, Diagnostic Imaging and Instrumentation
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Ultrasound Diagnosis of Intestinal Ascariasis

By Narayan Bikram Thapa
KIST Medical College, Nepal

Introduction- The conventional method of diagnosing ascariasis is by testing the stool for the presence of the eggs. When there are atypical abdominal symptoms a routine ultrasound scan using the common 3-3.5 MHz probe yields no definite findings to diagnose intestinal ascariasis. If a high frequency probe of 5-10 MHz is used instead, intestinal ascariasis could be definitely established. This case illustrates a typical worm diagn-osed with the help of a high frequency probe.

Keywords: ultrasound diagnosis, ascaris lumbricoides, intestinal ascariasis.

GJMR-D Classification : NLMC Code: WN 180

Strictly as per the compliance and regulations of:

Ultrasound Diagnosis of Intestinal Ascariasis

Narayan Bikram Thapa

Keywords: *ultrasound diagnosis, ascaris lumbricoides, intestinal ascariasis*

I. Introduction

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II. Case Report

A 17-year-old boy was referred from emergency for ultrasound scanning of abdomen because of vomiting and generalized abdominal pain mainly in the periumbical region of short duration.There was no history of fever and no sign of peritonitis. The routine abdominal scanning using a 3-3.5 MHz probe was inconclusive. Another attempt using a high-density multifrequency linear probe of 5-10 MHz showed an entirely striking picture. There was brighter tubular shadow having an average diameter of 4 mm with a central hypoechoic core (Fig. 1). A cross-sectional view of the worm typical bright ring shadow(Fig 2).. These structural features were consistent with the diagnosis of intestinal ascariasis. The other visceral echoes were normal.

III. Discussion

Ascaris lumbricoides is a common nematode infesting a major percentage of human beings worldwide (more than 1.4 billion). It grows to a maximum length of 35 cm. This species is host specific to human beings and lives longer (1-2 years) with in the small intestine. Infested individuals are mostly asymptomatic though it is a causative agent for some very common symptoms. The literature shows enough reports on biliary ascariasis [1,2,3,4] .The ultrasound scanning is the specific diagnostic tool in case of biliary infestation. Intestinal ascariasis demands the use of a higher frequency high-density probe of 5 - 10 MHz, as illustrated here. The live worm on longitudinal section appears as a writhing tubular shadow having brighter margins described by some as 'strip sign'. There is a hypoechoic core producing the 'inner tube sign'. The cross-sectional picture is also characteristic of a tubular body described as the ring sign or bull's eye sign if seen with in the CBD or a narrow lumen [2]. when the crowded worms form a ball like mass, the ultrasound sectional view can be called as the "stacked tubes sign"[5].

Fig. 1: A longitudinal section of segment of Ascaris lumbricoides shows the tubular shadow with brighter parallel walls (strip sign). The core is hypoechoic(inner tube sign). The patient's bowel walls are also identifiable

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Fig 2 : A cross-sectional view of the worm typical bright ring shadow

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Global Journal of Medical research: D
Radiology, Diagnostic Imaging and Instrumentation
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

CT Findings of Pneumonic Adenocarcinoma : Comparison between Invasive Mucinous Adenocarcinoma and Nonmucinous Adenocarcinoma

By Satoru Nakamura

Nagasaki Kawatana Medical Center, Japan

Abstract- The pneumonic adenocarcinoma (P-ADC) is defined as primary lung ADC with a radiological pneumonic presentation, usually referred to histologically as ADC with a mixed-invasive and BAC (bronchioloalveolar carcinoma) predominant subtype in the 2004 WHO classification. Invasive mucinous adenocarcinoma (IMA) formerly classified as mucinous BAC usually presents consolidative opacities mimicking pneumonia on CT, on the contrary such pneumonic type adenocarcinoma may occur in nonmucinous adenocarcinoma (NMA) formerly classified as nonmucinous BAC. These tumors should be separated into different categories, because they have clinical, pathologic and genetic differences1)2)3).

We compare the CT findings of the pneumonic type adenocarcinoma between IMA and NMA in 20 patients. CT findings of IMA and NMA were compared based on the characteristics of consolidation and accessory opacities.

GJMR-D Classification : NLMC Code: WP 460, QZ 241

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We compare the CT findings of the pneumonic type adenocarcinoma between IMA and NMA in 20 patients. CT findings of IMA and NMA were compared based on the characteristics of consolidation and accessory opacities. Pleural efuusion and lymphadenopathy were also analyzed. Two CT findings of cavitation or cyst and bulging fissure were statistically significantly different by Fisher's exact test between them.

I. Introduction

The purpose of this study was to compare the CT findings of pneumonic type adenocarcinoma between IMA and NMA.

II. Materials and Methods

We retrospectively studied twenty patients at four institutions in Nagasaki, Japan from 1999 to 2012. They consist of 11 females and 9 males with ages ranging from 40 to 87 years old (mean 71 years). They were pathologically proven pneumonic type adenocarcinoma by TBLB, cytology, operation for fourteen, two, four patients, respectively.

The pathological diagnosis was made by observing non-destructive growth of tumor along the alveolar wall with or without partly stromal invasion.

CT scans were obtained using Asteon multi, (Toshiba medical systems, Tochigi, Japan) or High Speed/FXI (General Electric, Milwaukee, USA) at 7.5mm or 10mm collimation. IV contrast material was administered to 2 patients with NMA, and 9 with IMA.

CT findings of IMA and NMA were compared based on the characteristics of consolidation: peripheral distribution, lower lung predominance, multifocal distribution, air bronchogram, cavitation or cyst, heterogeneity, surrounding ground-glass opacity (GGO), bulging fissure, and CT angiogram sign. Accessory opacities (centrilobular nodules, cavities, GGO), pleural effusion, and lymphadenopathy were also analyzed.

We compared CT findings and pathological findings such as IMA and NMA by Fisher's exact test (extended).

III. Results

CT showed cavitation or cyst (12/14), bulging fissure (9/14), peripheral distribution (6/14), and CT angiogram sign4) (5/9), in IMA, while, those findings were not seen in NMA type (Table.1). The former two findings were statistically significantly different between them. Lower lung predominance, multifocal distribution, air bronchogram5), heterogeneity, surrounding GGO, and centrilobular nodules were seen in both type with no significant difference. Lymphnode swelling was seen in one patient with both IMA and NMA. Pleural effusion was seen in five patients with only IMA.

We present some cases with pneumonic adenocarcinoma. Figure 1 showed NMA type pneumonic adenocarcinoma. The consolidation with air bronchogram sign is seen in right lower lobe, and centrilobular nodules in right middle lobe. Figure 2 showed the IMA type pneumonic adenocarcinoma. The bulging fissure and consolidation with cavity or cyst are seen in right lower lobe.

IV. Discussion

Diagnosis of the pneumonic type adenocarcinoma of the lung is usually delayed, because of mimicking infectious pneumonia on CT. Aquino et al reported that CT finding of peripheral consolidative pneumonia with surrounded nodules is more specific for BAC than infectious pneumonia6). Jung et.al reported that CT finding of air-filled bronchus with stretching,

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squeezing, widening of the branching angle or bulging of the interlobar fissure, favor the diagnosis of BAC in differenciating from infectious pneumonia7).

Operation is favorable when the pneumonic adenocarcinoma is limited8), however, in almost all patients of pneumonic type adenocarcinoma have a multilobar and bilateral involvemet, so they are sometimes applied to chemotherapy.

Guillermo Paez et. al founded that EGFR mutation in non-small cell carcinoma (NSCLC) patient, and treatment with the EGFR kinase inhibitor causes tumor regression in some patients9). Garfields et.al reported the two main cytologic types of BAC, ie, nonmucinous and mucinous, have some differing characteristics. Nonmucinous type of BAC frequently harbors epidermal growth factor receptor (EGFR) polysomy/mutation. On the other hand, mucinous BAC, presents more frequentry as a pneumoinic-type infiltrate, much more frequently harbors K-ras mutation. These might be more differences than similarities, suggesting 2 distinct phenotypes that might need to be treated differently in order to optimize management of the range of clinical disease10).

We compared the CT findings between IMA and NMA, and CT findings with bulging fissure and cyst or cavity were found to be seen in IMA, and not in NMA with statistically significant. Bulging fissure is one of the characteristic findings of BAC and can be caused by mucin production in the tumor, resulting in swelling of the lobe11). Our data showed cavitation or cyst are found in only mucinous type. Central necrosis within nodules, emphysematous changes due to check-valves of carcinomatous infiltrates at the terminal bronchioles, and circulatory disturbances are considerable to be responsible for the cyst formation12).

The number of cases are a few, however, it might be helpful differentiating between IMA and NMA on CT, and contribute to the therapy strategy.

V. Acknowledgment

We thank radiological advise for Dr. Ashizawa Kazuto, Dr. Uetani Masataka, and pathological consultation for Dr. Hayashi Tomayoshi at Nagasaki University Hospital.

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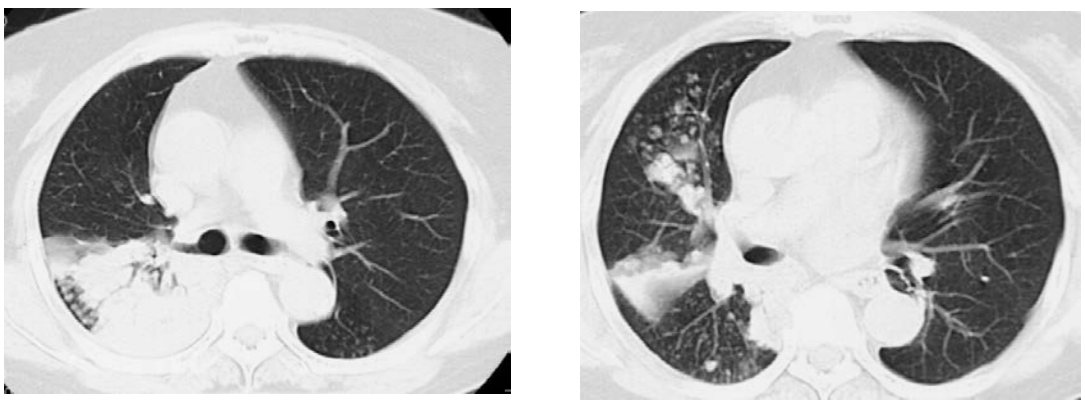

(a) (b)

Fig.1 : 78 female with NMA had a dyspnea. a) CT scan shows dense consolidation with air bronch-ogram in right lower lobe. b) CT scan of right lobe shows centrilobular nodules

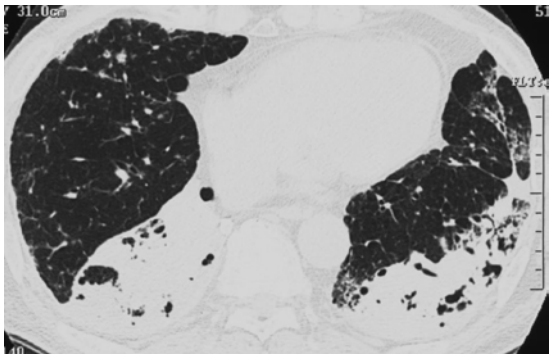

Fig. 2 : 82 y.o male with IMA had a bronchorrhea. Bulging fissure and cavity or cyst are seen in right lower lobe

Table : 1

	NMA(n=6)	IMA(n=14)
Consolidation		
peripheral distribution	0 (0%)	6 (43%)
lower lung predominance	1 (17)	6 (43)
multifocal	6 (100)	11 (79)
air bronchogram sign	5 (83)	12 (86)
mucous bronchogram	0 (0)	0 (0)
*cavitation (cyst)	0 (0)	12 (86)
heterogenous	4 (67)	7 (50)
surrounding GGO	1 (17)	7 (50)
*bulging fissure	0 (0)	9 (64)
CT angiogram sign	0 (0) n=2	5 (55) n=9
Accessory opacities		
nodules	5 (83)	7 (50)
centrilobular	5 (83)	7 (50)
random	0 (0)	0 (0)
CT halo sign	0 (0)	2 (14)
cavities (cysts)	0 (0)	4 (29)
GGO	1 (17)	6 (43)

P<0.05 Fisher's exact test (extended)

** statistically significant*

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Global Journal of Medical research: D
Radiology, Diagnostic Imaging and Instrumentation
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Educational Program for Radiography Students at Head CT

By Heggen KL, Johansen E, Silkoset RD & Karikari PD

Oslo University Hospital, Ullevål, Norway

Abstract- Introduction: An educational program was designed to improve relevant competence in brain anatomy, pathology, CT technique and physics among radiography students training at the section of neuroradiography, Oslo University Hospital, Ullevål.

Method and Materials: The educational program consisted of lectures, a compendium, hands-on lessons and competence testing. The lectures and compendium focused on brain anatomy, pathology, CT technique and physics. All second year radiography students at the University College in Oslo completed the same competence tests before and after their hospital training. This allowed a comparison of the competence improvement among students who followed the educational program, with those who did their training elsewhere (the control group).

The second year class comprised of 40 students. 29 took the initial test. Out of this number 12 participated in the program while the remaining 17, defined above as the control group, did not.

A total of 30 students however took the final test. 3 students who actually took part in the program opted out of the final test, reducing the number to 9 while the number of students in the control group was increased to 21 because 4 students who did not take the initial test joined the control group at the final test.

GJMR-D Classification : NLMC Code: WG 500

EDUCATIONALPROGRAMFORRADIOGRAPHYSTUDENTSATHEADCT

Strictly as per the compliance and regulations of:

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Results: Radiography students who participated in the educational program improved their test score from 31% to 61%, while the control group improved their score from 33% to 34%.

Conclusion: This study demonstrates a pronounced improvement in level of competence among students who followed the educational program.

I. Introduction

Head CT is a routine examination performed in all radiological facilities, the most frequently performed CT examination in Norway and the preferred examination in investigating acute head injury. The examination does not take more than a couple of minutes to perform. It is important that the radiographers know the normal anatomy of the brain and some pathology so they can react quickly if the scans show pathology that needs immediate treatment. It is not the radiographers' job to diagnose the patient. A fair knowledge of relevant pathology makes for easier and early communication between radiographer and radiologist for the initiation of treatment. Consequently, regular updating of knowledge provides a safer and smoother quality of examinations.

At the section of neuroradiography, Oslo University Hospital, Ullevål, we had seen a lack of competence in brain anatomy, pathology, CT technique and physics among the radiography students training at our section. We made similar observation among the new employees as well. We wanted to give the radiography students a better understanding of how the brain works and how it is affected by injury, and also focus on the importance of the head CT examination. It was also our aim to improve relevant competence in CT technique and physics among the radiographers working at the section of neuroradiography.

II. Method and Materials

In the autumn of 2009 we applied for financial support from a collaborative educational fund initiated by Oslo University Hospital and Oslo University College to start working on a project which would involve students pursuing radiography education at Oslo University College. The application was approved and a project team was put together. The team consisted of the manager of the section of neuroradiography, one representative from the Department of Radiography at Oslo University College and the senior technologist at the neuro CT.

We prepared a compendium that focused on normal anatomy of the brain, pathology, CT technique and physics. Contents of the compendium included among other things an example of a head CT scan protocol where all the relevant specialized CT related terminologies were explained. The compendium has a total of 71 pages of text, illustrations, figures and CT images. Topics in the compendium were selected based on our experience of what areas students and newly employed radiographers needed to improve their knowledge on.

We created 18 anonymous cases at the CT workstation and designed hands-on lessons for the students to work with. The tasks were made together with the representative from the radiography education at Oslo University College. The students were encouraged to make new series in different directions

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with different slice thicknesses to help them recognize normal anatomy, and find projections to visualize possible pathology in the images. The objective was not only to make the students familiar with the different scanning techniques, but also to satisfy learning objectives set by the curriculum of the Department of Radiography at Oslo University College.

We made lectures using PowerPoint presentations on anatomy/pathology on one hand, and CT technique/physics on the other. Pre-training and post-training tests were designed to help us compare competence improvement of the students before and after the program.

The lectures were held by the senior technologist for the two students training at the neuro CT each particular week. The lectures were divided into anatomy and pathology for the first day of the week and CT technique and physics for the second day.

The tests consisted of 33 tasks, some multiple choice questions and figures which required students to name anatomical structures. In other tasks students were encouraged to provide answers with their own text. Maximum obtainable score at the test was 71 points. 16 of the tasks had relevance to topics in anatomy and pathology, while the remaining 17 related to CT technique and physics.

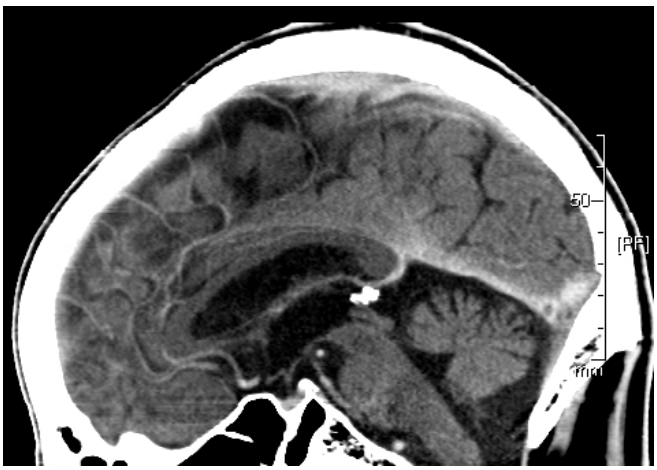
For purposes of quality assurance the program was tested with the radiographers at the section of neuroradiography at Oslo Univeristy Hospital, Ullevål, before the involvement of the recruited students. The section consisted of 14 radiographers, four of them worked exclusively with MRI or intervention. Participation in the test was voluntarly and results were made anonymous. We had 45 minutes long lecture each day; the first day's topics were anatomy and pathology based while the second day's lecture covered CT technique and physics.

Copies of the compendium were made available in all of our 5 laboratories. Because our section of neuroradiography is usually very buisy and time that is available for viewing cases at the workstation rather limited, radiographers were encouraged to put more emphasis on familiaraizing themselves with the content of the compendium whenever they had any free time. Both the tests were held during the department's regular educational time. The post-training test was held 4 weeks after the pre-training test. This allowed the radiographers ample time to read the compendium between the two tests. At the end of the program the results of the two tests were not completely comparable because some radiographers took either the first or the second test, while others took both. Evaluation of the program after the last test was held resulted in a marginal increase of the maximum available score to 72 points.

Oslo University College offers a three year bachelor's program for radiographers. We selected the second year students as our group of interest. The reason for this was that they were due to start a six - week internship in different hospitals as part of the CT module of the college. The educational program was added as a mandatory part of the internship period for the 12 students at Oslo University Hospital, Ullevål. To make it possible for all these students to get involved in the program, two students, instead of the usual one, were attached to the neuro CT each week.

For the students the pre-, and post-training tests were held at Oslo University College before and after the internship. The tests were mandatory for students who had their internship at our section, while those who had their internship elsewhere could opt to take the tests or not. Students who did not have their internship at our section were designated the control group. For ease of separation from the control group and to facilitate judgement of competence improvement, the test sheets of the students who had their internship at our section were marked with the letters "NR."

Figure 1 : Example of a task from the test: " Name the different parts of the ventricular system (arrows)"



On the first day of the project week the students had lessons in anatomy and pathology, received their own compendium and the tasks for the cases at the workstation. The program involved separating the day in two halves; while one student sat half of the day at the workstation, the other student got involved in the normal routine at the CT laboratory. Then they swiched at lunchtime. Students were offered direct help in the use of relevant applications at the workstation on the first day, while the second day was reserved for lessons in CT techniqe and physics. At the end of each week a supervisory radiographer showed the students the correct answers to the tasks at the workstation.

III. Results

The second year class comprised of 40 students. 29 took the initial test. Out of this number 12

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A total of 30 students however took the final test. 3 of the 12 students who actually took part in the program opted out of the final test, reducing the number to 9. The number of students in the control group increased to 21 because 4 students who did not take the initial test joined the group at the final test.

Test before internship
Students in the program (NR): 31% correct
Control group (CG): 33% correct

Test after internship
Students in the program (NR): 61 % correct
Control group (CG): 34% correct

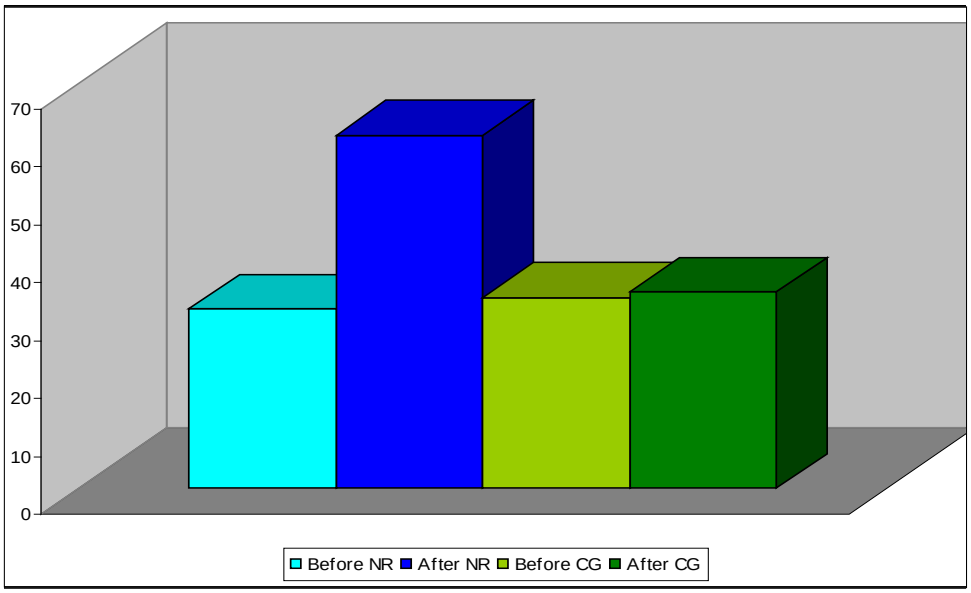

Diagram 1 : Overall results radiography students

The results separated by topics (anatomy, pathology, CT technique and physics):

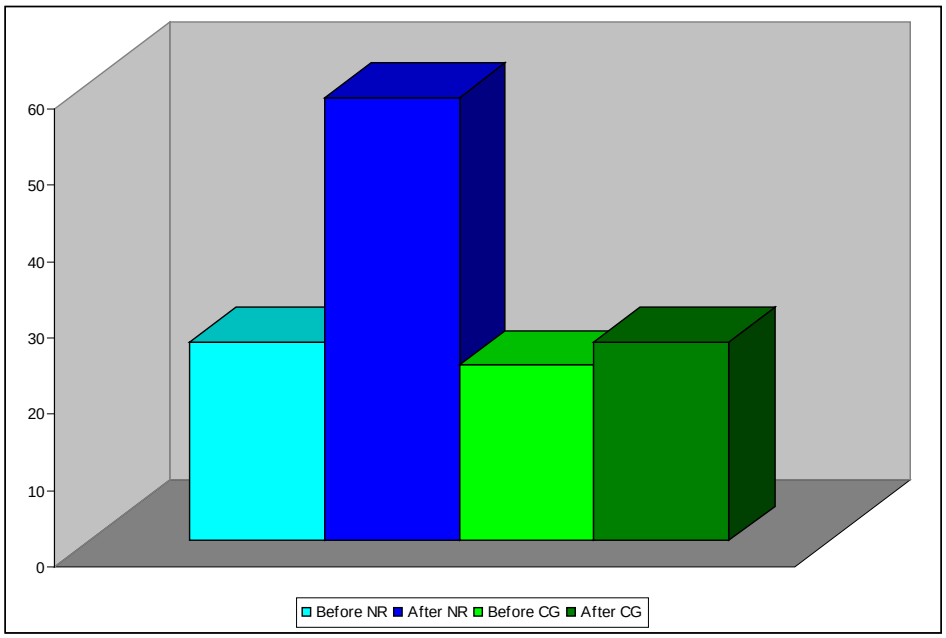

Diagram 2 : Testresults anatomy

Before NR	26 % correct
After NR	58 % correct
Before CG	23 % correct
After CG	26 % correct

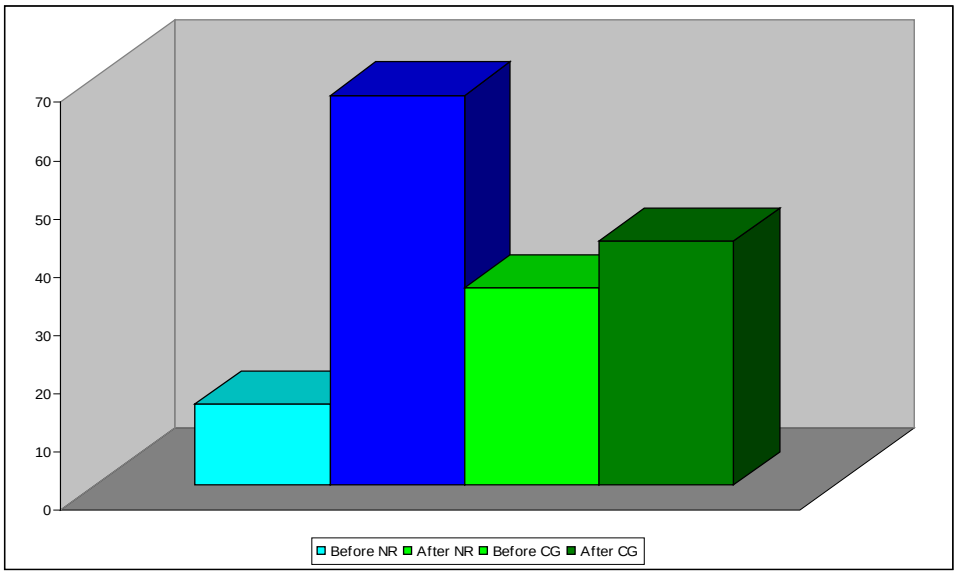

Diagram 3 : Testresults pathology

Before NR	14 % correct
After NR	67 % correct
Before CG	34 % correct
After CG	42 % correct

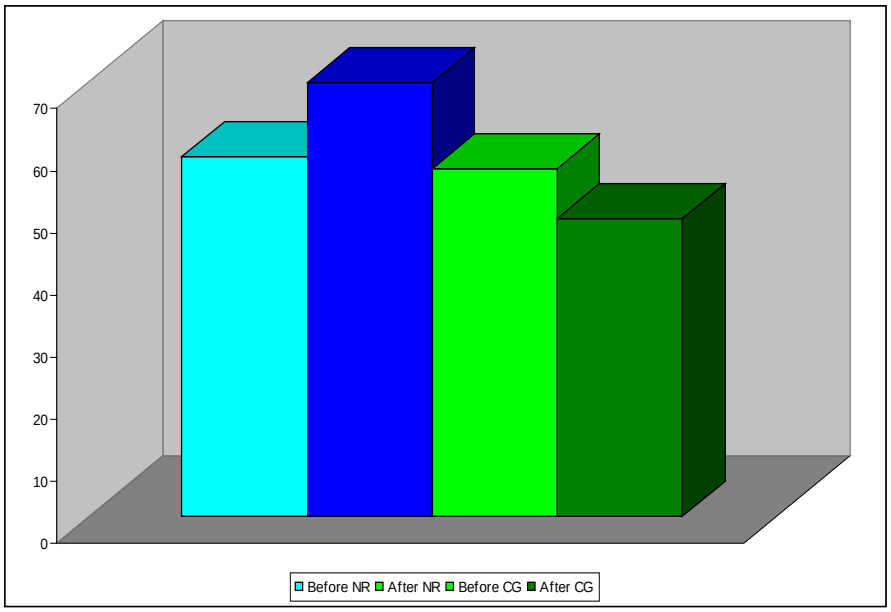

Diagram 4 : Testresults CT technique

Before NR	58 % correct
After NR	70 % correct
Before CG	56 % correct
After CG	48 % correct

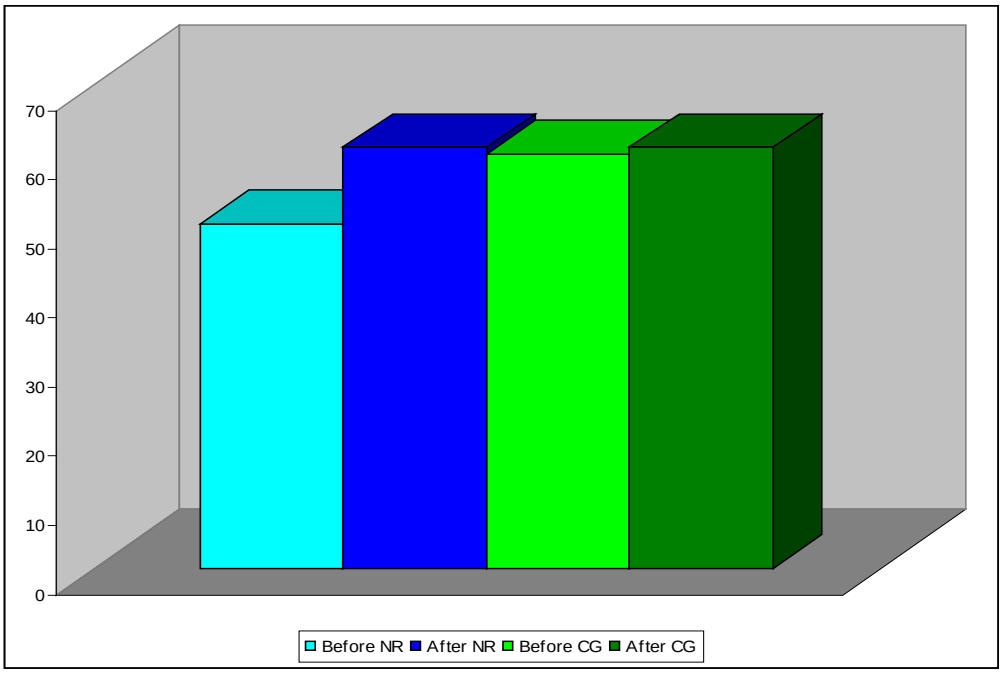

Diagram 5 : Testresults CT physics

Before NR	50 % correct
After NR	61 % correct
Before CG	60 % correct
After CG	61 % correct

IV. Discussion

The selection of the students who had their internship at Ullevål and participating in the program was randomized and made by the professional development manager at the Department of Radiology and Nuclear Medicine at Ullevål.

The Department of Radiography at Oslo University College was responsible for conducting the tests for the students before and after the internship. The first test was printed in color by a printing facility on campus. Unfortunately, because of printing difficulties, some students only received black and white copies while they sat for the second test. It turned out that the black and white printouts were of such poor quality that many of the students could not tell apart structures which had arrows pointed at them (ref. Figure1). This necessitated the printing of new (second) test sheets, all in color. Consequently all the students had to retake the second test.

In this respect, one can question whether the fact that the students had to take the second test twice had a negative impact on their motivation to do so, but the test results showed such significant improvement in competence that any possible effect of retaking the test could be discounted.

The section of neuroradiography was before the reorganization of Oslo University Hospital, Ullevål, a section specializing in neuro imaging . Students who had their internship here were therefore likely to see more CT examinations of the head than students who had their internship elsewhere. The section of neuroradiography had a GE (General Electric) LightSpeed XTE CT scanner, therefore it was costumary to use CT terminology adapted from this scanner. Students who had their internship in other hospitals and worked with CT scanners from other manufactures would be expected to be used to a different set of terminology from what is used in our section. This could be a possible handicap in answering questions regarding CT technique founded on GE's terminology in the test .

It merits repeating that students who had their internship with us were expected to have an inordinately more exposure to neurofocused imaging. This would turn out to be a contributing factor as to why the "NR" students scored so much better after the internship.

The anatomy and pathology based tasks were presumed to be easier to handle since they comprised of figures and CT images where students were expected to name anatomical structures and pathology. Tasks in relation to CT technique and physics, however, were presented as multiple choice questions.

The test results confirmed the above presumption as students scored highest on the anatomy and pathology tests. Another contributing factor was that greater emphasis was placed on anatomy and pathology in the compendium.

The students in the control group also showed some competence improvement in the same topics after the internship, which may indicate that they, too, had used the internship to improve their knowledge of brain anatomy and pathology.

The students' test results within CT technique and physics showed that the students had a fair grasp of these topics before the internship. Students who participated in the program (NR) significantly raised their competence, judged by their scores of the final test, while the control group (CG) scored lower on the same test.

The PowerPoint lectures were held at the section of neuroradiography by the senior technologist at the neuro CT each week for the two interns that paricular week. The teaching session involved an open dialogue among the senior technologist and the interns, which paved the way for the interns to directly access the teacher with questions along the way.

Much of the work leading up to the start of the program went into writing the compendium. The compendium consists of 71 pages, where 54 pages were allocated to anatomy and pathology. The remaining 17 pages covered CT technique and physics.

In the aftermath students has communicated positive feedback especially with respect to the formulation of tasks in the program, the contents of the compendium and the direct access they had to ask relevant questions throughout their stay. The above factors were viewed as particularly motivating in the run-up to the final test.

V. Conclusion

This study shows a significant improvement in level of competence among the students who had their internship at the section of neuroradiography, Oslo University Hospital Ullevål and participated in the educational program, compared to those students who had their internship elsewhere.

Global Journal of Medical research: D
Radiology, Diagnostic Imaging and Instrumentation
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Neurogenic Bladder Revealing a Pernicious Anemia: One Case Report and Literature Review

By Omar Riyach, Mustapha Ahsaini, Mohammed Fadl Tazi, Jalal Eddine El Ammari, Mohammed Jamal El Fassi, Abdelhak Khallouk & Moulay Hassan Farih

University Hospital Center Hassan II-FES, Morocco

Abstract- *Background:* Neurogenic or neuropathic bladder is defined as any defective functioning of the bladder caused by impaired innervations. Pernicious anemia is a rare cause of neurogenic bladder and it is often accompanied by other neurological manifestations. The standard treatment is based on parenteral vitamin administration. We report a unique case of pernicious anemia revealed by a neurogenic bladder succefully managed by vitamin B12 administration.

Case presentation: A 45-year-old man presented with lower urinary tract symptoms (LUTS) with urine retentions. The patient was an important postvoid residual volume. The uroflowmetry result of the patient was low. Cystoscopy reveals a normal urethra, prostatic fossa, and bladder. Urodynamic testing demonstrated a failure voiding bladder. The diagnostic of pernicious anemia was suspected in laboratory exams which have showed megaloblastic anemia and Serum antibodies to gastric parietal cells, the diagnostic was confirmed by gastric biopsy.

GJMR-D Classification : *NLMC Code: WL 141*

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Conclusion: The vesicosphincteriens disorders in pernicious anemia are very little detail in the literature .our case is to our knowledge the first to have urinary voiding dysfunction as the only symptom of pernicious anemia with spectacular improvement after vitamin B12 administration.

I. Introduction

Neurogenic lower urinary tract dysfunction or neurogenic bladder (NGB) dysfunction may be caused by various diseases and events affecting the nervous system controlling the lower urinary tract [1]. It occurs equally in men and women [2]. Pernicious anemia is a rare cause of myelopathy linked to a deficiency of vitamin B12. The urinary disturbances are part of the neurological signs. But it has never seen that a neurogenic bladder was the first and the only neurological sign of this pathology. We report one case of pernicious anemia revealed by neurogenic bladder with complete urinary function recovery after treatment with vitamin B 12, and we analyzed the clinical data and reviewed the relevant literature published.

II. Case Presentation

A 45-year-old man presented with mild to moderate lower urinary tract symptoms (LUTS) of one year duration with frequent history of catheterizations for urine retentions. He has no past history of infection, urethral stricture disease, or benign prostatic hypertrophy. The patient was comfortable and had no sensation of needing to void. The physical examination reveals no sensitive or motor deficits. A catheter was placed but the patient was unable to void after the catheter was removed. A postvoid residual volume obtained by noninvasive bladder ultrasonography reveals 1000 mL (figure 1).

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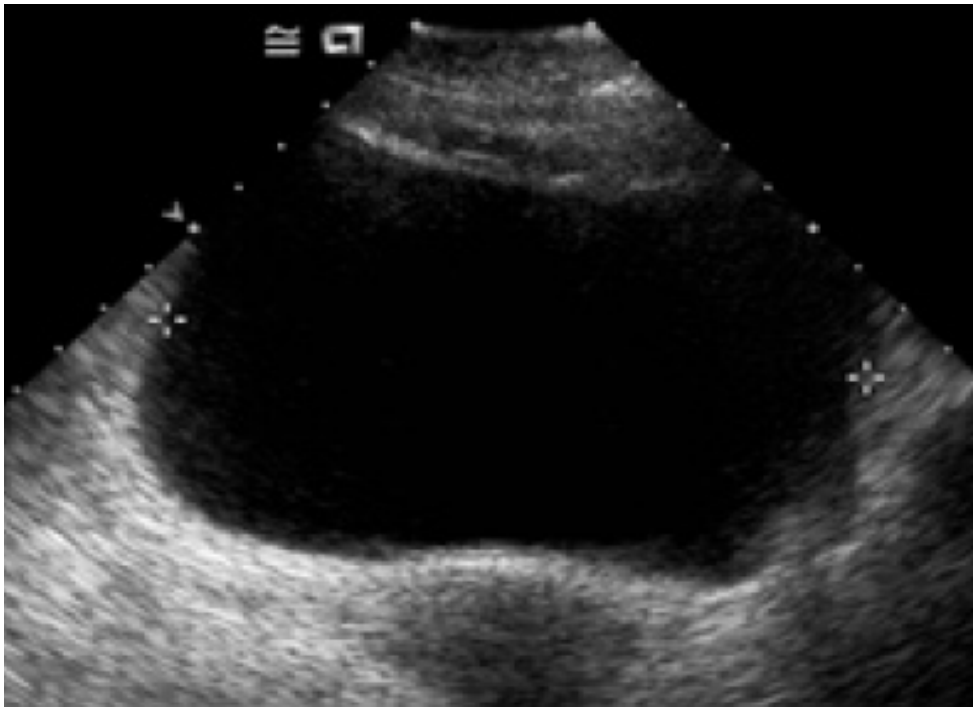

Figure 1 : A postvoid residual volume obtained by noninvasive bladder ultrasonography reveals 1000 mL

Retrograde and voiding urethro-cystography was normal (figure 2). The uroflowmetry result of the patient was Qmax: 6, 3 mL/sec. Cystoscopy reveals no obstructive lesions and a normal-appearing urethra, prostatic fossa, and bladder. Urodynamic testing demonstrated a normal capacity, compliant bladder

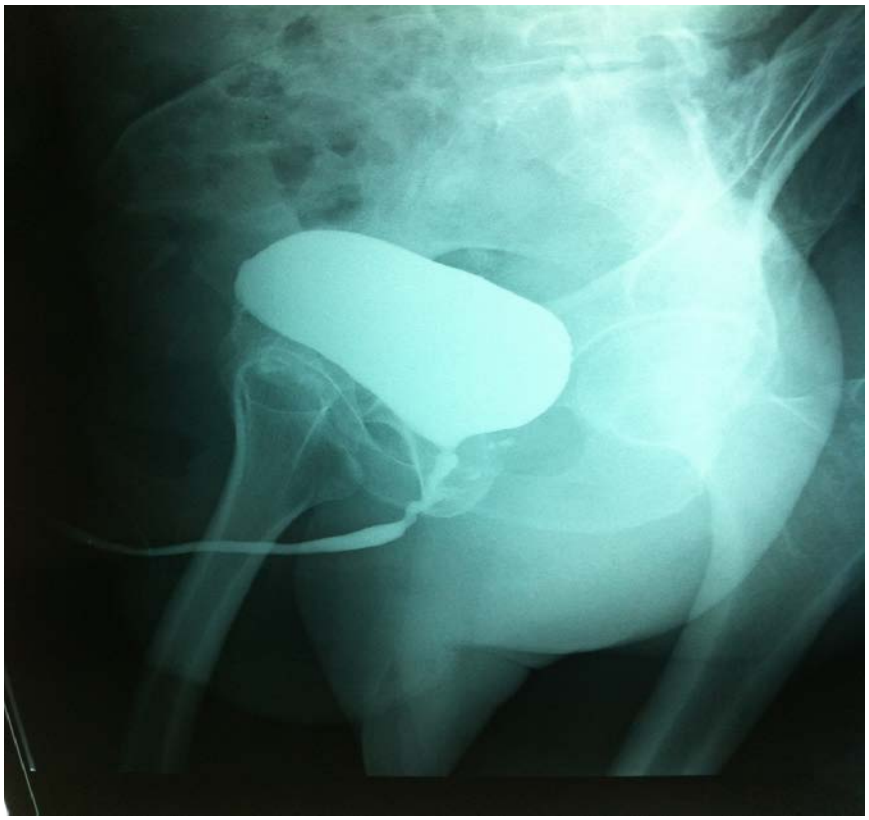

Figure 2 : Retrograde and voiding urethro-cystography was normal

The patient was unable to sense filling at any volume and is also unable to generate any voiding contraction (figure 3). Examination of the peripheral blood showed the red blood cell count to be 2, 2 million, WBC 28oo, hemoglobin 7.9 Gm. per 300 cc., hematocrit 28 per cent, and average cell volume 12.7 Cu. microns. In the stained blood films the erythrocytes varied greatly in size and in shape, reticulocytes were slightly less than a per cent, and the percentage of neutrophils was reduced with many of them having multilobed nuclei. Laboratory exams showed also revealed Serum antibodies to gastric parietal cells in the peripheral blood examination, the diagnosis of pernicious anemia was selected by highlighting a chronic gastritis fundic atrophy and intrinsic factor antibodies. The patient was treated by vitamin B12 orally at 500 mg / day and received a folic acid. The evolution was marked by a disappearance under treatment of urinary disturbances, macrocytosis correction and normalization of vitamin B12. At 6 months follow-up, clinical symptoms had improved, and postvoid residual (PVR) was 75 mL.

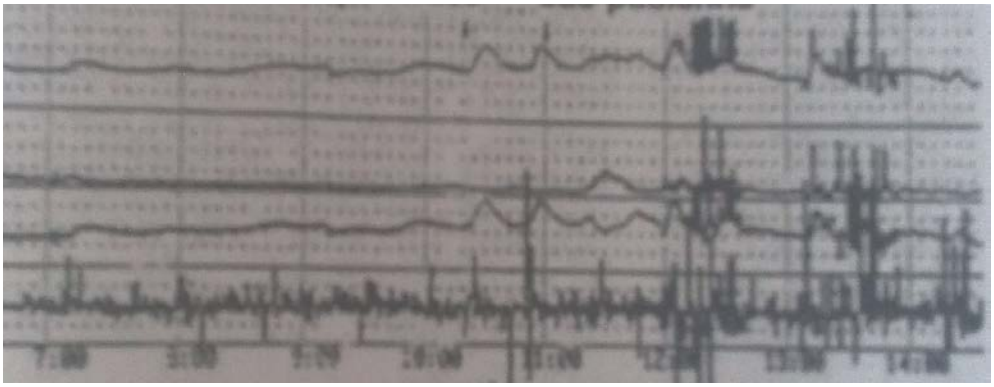

Figure 3 : Urodynamic testing demonstrated the unabilty to generate any voiding contraction

III. Discussion

Pernicious anemia (PA) (also known as Biermer's disease [3] and Addisonian anemia [4]) is a macrocytic anemia due to vitamin B12 (cobalamin) deficiency, which, in turn, is the result of deficiency of intrinsic factor [5]. The deficiency of intrinsic factor is a consequence of the presence of atrophic body gastritis (ABG), which results in the destruction of the oxyntic mucosa, and thus, the loss of parietal cells, which normally produce chlorhydric acid as well as intrinsic factor [6]. The term PA is sometimes used as synonym for cobalamin deficiency or for macrocytic anemia, but to avoid ambiguity, PA should be reserved for conditions that result from impaired secretion of intrinsic factor and atrophy of oxyntic mucosa [7]. PA is considered an autoimmune disorder due to the frequent presence of gastric autoantibodies directed against intrinsic factor, as well as against parietal cells. PA is often considered a synonym of autoimmune gastritis, because PA is thought to be the end stage of an autoimmune process that results in severe damage of the oxyntic gastric mucosa [8]. Recent experimental and clinical data strongly suggest an involvement of long-standing Helicobacter pylori (H pylori) infection in the pathogenesis of ABG and PA, but it is still under debate whether PA may be included among the long-term consequences of H pylori gastritis [9]. Disturbed genito-urinary function is a well known late result of neurologic disease in patients with pernicious anemia but the details of the functional deficit as related to the general neurologic condition as well as the eventual prognosis have received very little study. The earliest symptom to appear in male patients is usually impotence. Hesitancy, weakness of the urinary stream, and finally urinary retention, dribbling, or overflow incontinence develop later. Exceptionally our patient presented a neurogenic bladder as the first and the only symptom of pernicious anemia. Neurologic examination in these patients invariably shows cutaneous sensory impairment in the lower legs and diminished or absent vibratory sense to the level of the iliac crests. Evidence of lateral column disease may or may not be present. Cystometric examination usually discloses the presence of an atonic bladder paralysis with impaired sense of bladder filling, very low intravesical pressure, increased bladder capacity and variable amounts of residual urine. Most observers agree that bladder neck and sphincter symptoms may disappear with treatment of the pernicious anemia [10, 11, 12]. As we have shown in our case the patient regained normal bladder function as regards both symptoms and cystometric findings after a few of liver therapy by vitamin B12. The prognosis when the paralysis is of longer duration is undoubtedly less favorable. Urologic measures designed to avoid mechanical damage to the detrusor muscle, urinary tract infection, and bladder neck obstructions are of prime importance during the period of recovery. The clinical management of patients with PA is based on the treatment of cobalamin deficiency which is able to correct the anemia, whereas the neurological complications may be corrected only if the replacement

treatment is given soon after their onset. The therapeutic recommendations for PA with regard to dosage and administration of vitamin B12 substitution treatment are divergent [13]. According to our protocol, a higher dosage of cobalamin is used orally at 500 mg / day in addition of folic acid. PA is an often silent and under-diagnosed autoimmune disease, because its onset and progression are very slow, According to the literature the urinary disorders occur at an advanced stage of the disease and respond to treatment with vitamin B 12. For the first time in the English literature, a case of pernicious anemia diagnosed by neurogenic bladder as the only manifestation of this pathology is presented. Our findings indicate that treatment of urinary retention associated with pernicious anemia is managed by intermittent catheterization with oral vitamin B12 administration, with complete urinary function recovery.

IV. Conclusion

Neurogenic bladder is one of disturbed neurologic function that occurs in pernicious anemia, but it has never been reported that this symptom is the only manifestation of this disease. Our case is the first of its kind to expose this clinic particularity, and still the best example for a reversible neurogenic bladder with complete recovery of urinary function after medical treatment.

a) Consent

Written informed consent was obtained from the patient for publication of this manuscript and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Global Journal of Medical research: D
Radiology, Diagnostic Imaging and Instrumentation
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Role of Diffusion-Weighted Imaging and Apparent Diffusion Coefficient in Differentiating between Local Tumor Recurrence and Benign Breast Changes after Breast Conservative Surgery

By Wael Abdulghaffara MD & Magdy M. Tag-Aldeinb FRCS
Mansoura University, Egypt

Abstract- Objective: To assess the role of DWI and the ADC in differentiating between local tumor recurrence and benign breast changes after breast conservative surgery.

Materials and Methods: 26 patients (age range, 25–68 years; mean age, 49 years) with breast conservation surgery were included in our study. MRI study was done using bilateral fat-suppressed T2- weighted fast spin-echo, axial STIR, axial T1- weighted fast spin-echo. DWI series were acquired using echo planar imaging pulse sequences incorporating with diffusion gradients and finally dynamic contrast enhancement study was done.

Results: Among the twenty sex patients underwent MR imaging in our study, 7 patients were diagnosed at histopathology as local tumor recurrence at the site of surgery, and 11 patients had surgical scarring, 6 patients had seromas, one patient had hematoma and one patient had fat necrosis.

Keywords: diffusion-weighted imaging, apparent diffusion coefficient, breast lesions.

GJMR-D Classification : NLMC Code: WP 815, WP 800

Strictly as per the compliance and regulations of:

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Results: Among the twenty sex patients underwent MR imaging in our study, 7 patients were diagnosed at histopathology as local tumor recurrence at the site of surgery, and 11 patients had surgical scarring, 6 patients had seromas, one patient had hematoma and one patient had fat necrosis. Local tumor recurrence showed lower ADC values (mean ADC = 0.95 ± 0.37 x 10-3 mm2/s) than that of benign lesions (mean ADC = 1.69 ± 0.16 x 10-3 mm2/s). The sensitivity and specificity of DWI in the differentiating local tumor recurrence from benign breast lesions were 100 % and 94.7 %, respectively.

Conclusion: DWI is easy to obtain in short scan time and easy to evaluate, and ADC values can differentiate between local tumor recurrence and benign breast changes after breast conservation surgery with high sensitivity & specificity.

Keywords: diffusion-weighted imaging, apparent diffusion coefficient, breast lesions.

I. Introduction

With breast conservation therapy, the rate of recurrence is low but not zero. The statement that outcomes in women who undergo breast conservation are equivalent to the outcomes in women who undergo mastectomy is debatable. The trials that have been performed to date have shown that women who undergo breast conservation have a higher risk of local recurrence. Thus, disease free survival is not equivalent (1). It was previously thought that local recurrence did not affect overall survival. However, it is now well accepted that local relapse does affect overall survival. Therefore, preventing local recurrence is considered as important as the early diagnosis of the primary breast cancer. The ability to prevent local recurrence requires more accurate staging and subsequent treatment; this is where MRI can play a critical role (2, 3, 4).

Architectural distortion and increased density at the lumpectomy site as well as post-treatment edema may impair accurate detection of recurrence at mammography and ultrasonography (US). Local-regional recurrences occur in approximately 5% of patients at 5 years with a local failure rate of approximately 1%–2.5% per year. In the immediate postoperative period, suspicious findings likely represent residual disease, whereas local recurrence typically occurs 3–7 years after breast conservation therapy. Early detection of local recurrence of breast cancer has been shown to significantly improve long-term survival (5).

Dynamic contrast material–enhanced magnetic resonance (MR) imaging has been shown to aid significantly in detection and characterization of primary and recurrent breast cancers (6,7). The sensitivity of breast MR imaging for detection of residual and recurrent tumor in the post- breast conservation therapy is over 90% (8.9). Breast MR imaging has been shown to be useful in differentiating scar tissue from tumor recurrence; in particular, non-enhancing areas have a high negative predictive value for malignancy (88%–96%) (10,11).

Currently, there is much variability in use of breast MR imaging to follow up women after breast conservative therapy. The practice guidelines of the American College of Radiology state that breast MR imaging may be useful in women with a history of breast cancer and suspicion of recurrence when clinical, mammographic, or sonographic findings are inconclusive (12). Although women with a previous

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diagnosis of breast cancer are at increased risk for a second diagnosis, an American Cancer Society panel concluded that the increased risk due to a personal history of breast cancer alone does not justify a recommendation for overall screening with MR imaging in women who have undergone breast conservation therapy (13).

Currently one of the most important indications for MRI is the differential diagnosis between cancer recurrence and surgical scar. In fact, breast MRI has become a common practice in the evaluation for recurrence of breast cancer. Both surgery and radiation can cause scarring with architectural distortion of the breast, which makes assessment of local recurrence difficult by means of clinical examination, mammography, and ultrasound. Post-treatment changes can mimic malignancy or obscure locally recurrent breast cancer. For these reasons, breast MRI is a useful tool in the evaluation of such patients (14,15, 16).

Diffusion-weighted imaging (DWI) is an unenhanced MRI sequence that measures the mobility of water molecules in vivo and provides different and potentially complementary information to (Dynamic Contrast Enhancement) DCE-MRI. DWI is sensitive to biophysical characteristics of tissues, such as cell density, membrane integrity, and microstructure. Promising findings from preliminary DWI studies of the breast have shown significantly lower apparent diffusion coefficient (ADC) measures for breast carcinomas than for benign breast lesions or normal tissue [17–23]. The lower ADC in malignancies is primarily attributed to higher cell density causing increased restriction of the extracellular matrix and increased fraction of signal coming from intracellular water [17, 18, 24]. A recent study reported high accuracy for characterizing enhancing breast masses through a multivariate combination of DWI and DCE-MRI features [25].

II. Objective

The aim of our study was to assess the role of DWI and the ADC in differentiating between loco-regional tumor recurrence and benign breast changes after breast conservative surgery.

III. Material & Method

a) Patients

Between June 2009 and February 2013, 26 patients (age range, 25–68 years; mean age, 49 years) with breast conservation surgery (lumpectomy & partial mastectomy) were included in our study. Patients were imaged using conventional MRI, DWI and DCE-MRI before biopsy of their breast lesion. Approval for the study was obtained from the local ethical committee in the Al-Noor specialist hospital, in Holey Makkah. Written informed consent was obtained from all patients before MRI. In all patients, MRI was performed bilaterally. Examinations were excluded if no diffusion weighted imaging had been performed, no measurable mass on DWI or less than one year of follow-up is not available.

b) MRI technique

MRI examinations were performed using a 1.5-T MRI scanner (Magnetom Espree, Siemens Healthcare). Patients were examined in the prone position using a dedicated 4-channel phased array bilateral breast coil. Before administration of contrast media, axial bilateral fat-suppressed T2- weighted fast spin-echo, axial STIR, axial T1-weighted fast spin-echo and DWI series were acquired.

DW image was performed in axial slice orientation using echo planar imaging pulse sequences incorporating with diffusion gradients. DW EPI with fat suppression was applied using TR/TE of about 8400/98 ms, FOV of 340 x 170 mm, matrix: 192 x 96 and a slice thickness of 4 mm. Spectral pre-saturation with inversion recovery (SPAIR) was used for fat suppression. An acceleration factor of two was applied using the generalized auto-calibrating partially parallel acquisition (GRAPPA) of parallel imaging technique. Motion-probing gradients in three orthogonal orientations were applied with b values of 50, 400 and 800 using 3-scan trace calculation. Isotropic diffusion- weighted (trace) images were reconstructed for each b value. For quantitative analysis of the data acquired from DWI, ADC maps were automatically created using software provided by the MRI system manufacturer (Syngo, Siemens Healthcare) using three b values (50, 400, and 800 s/mm2). We apply the DW sequences prior to the dynamic scan as the T1 relaxation due to the contrast agent will cause changes to the inversion of the tissue and thus can have a strong impact.

Finally, dynamic axial bilateral breast images of fat-suppressed high-resolution T1-weighted 3D fast gradient-echo images were sequentially acquired. Five measurements were acquired one before and four after the administration of contrast media. For the dynamic study, gadopentetate dimeglumine (Magnevist) was administered IV using a power injection at a dose of 0.1 mmol /kg of body weight at a flow rate of 2 mL/s, followed by flushing with 25 mL of saline. The parameters were as follows: TR/TE 4.2/1.6; flip angle 15°; FOV 340 × 340 mm; matrix 512 × 410; thickness 0.9 mm; acquisitions 1; and acquisition time 110 seconds. SPAIR for fat suppression and a GRAPPA acceleration factor of two for parallel imaging technique were also applied. DCE was done in 25 cases and contraindicated in one patient with renal failure on hemodialysis with GFR less than 30Ml/min.

IV. Results

Among the twenty sex patients undergoing MR imaging in our study, diagnosis of local tumor recurrence of breast carcinoma at the surgical site was pathologically proved in seven cases. Eleven patients

had surgical scarring, six patients had seromas, one patient had hematoma and one patient had fat necrosis.

According to the ADC values (Table 1) seven lesions were local tumor recurrence (Fig. 1 and Fig. 2), and showed mean ADC values of 0.95 ± 0.37 x 10-3 mm2/s and ADC range of (0.76 – 1.33 x 10-3 mm2/s).

In our study nineteen lesions were benign; 11 lesions were post-operative scarring (Fig.3) and showed mean ADC values of 1.66 ± 0.28 x 10-3 mm2/s and ADC range of (1.35 - 1.86 x10-3 mm2/s), 6 lesions were seromas (Fig.4) and showed mean ADC values of 2.21 ± 0.15 x 10-3 mm2/s and ADC range of (2.13-2.73 x 10-3 mm2/s), one lesion were hematoma (Fig.5) and showed mean ADC values of 0.39 ± 0.16 x 10-3 mm2/s and ADC range of (0.34 – 0.56 x 10-3 mm2/s) and one lesion was fat necrosis (Fig.6) and showed mean ADC values of 0.141 ± 0.26 x 10-3 mm2/s and ADC range of (1.22 – 0.161 x 10-3 mm2/s).

Table 1 : Different ADC values for recurrent tumor and benign breast lesions after conservation surgery

Types of lesions	No. of lesions N= 26	ADC Values ($\times 10^{-3}$mm2/s)	
		Range of ADC	Mean ADC
• Local tumor recurrence	7	0.76 - 1.33	0.95 ± 0.37
• Scar tissue	11	1.35 - 1.86	1.66 ± 0.28
• Seromas	6	2..13 - 2.73	2.21 ± 0.33
• Hematoma	1	0.34 - 0.56	0.39 ± 0.16
• Fat necrosis	1	1.22 - 0.161	1.41 ± 0.26

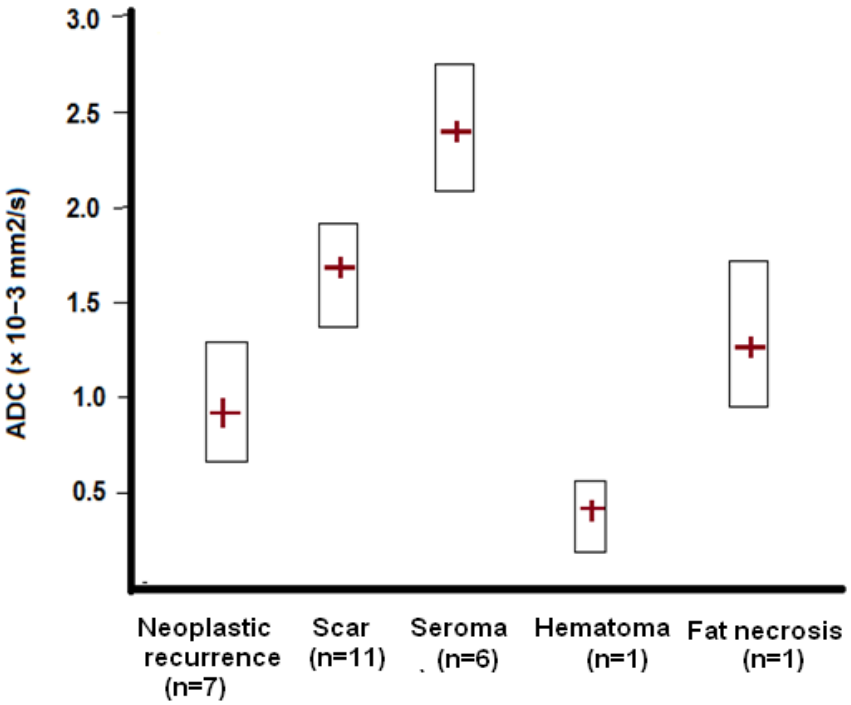

Fig. 7 : Box plots graphs of apparent diffusion coefficient (ADC) values for local neoplastic recurrence (n=7) and benign breast changes (n=19) after breast conservation surgery

All cases of local tumor recurrence in our study showed lower ADC values than benign lesions with ADC range of 0.76 - 1.33 x 10-3 mm2/s (mean ADC = 0.95 ± 0.37 x 10-3 mm2/s) and were diagnosed pathologically as malignant breast lesions. All benign lesions showed higher ADC values with a range from 1.22- 2.73 x 10-3 (mean ADC = 1.69 ± 0.16 x 10-3 mm2/s) except one case of hematoma showed lower ADC value (0.34 – 0.56 x 10-3 mm2/s) and was diagnosed by conventional MRI. Figure seven shows box plots graphs of range and mean apparent diffusion coefficient (ADC) values for local regional neoplastic tumor recurrence and benign breast changes after breast conservation therapy in our study.

In our study, using a cutoff point 1.35 x 10-3 mm2/s, the sensitivity, and specificity for DWI in the differentiating local tumor recurrence from benign breast lesions were 100 % and 94.7 %, respectively and total accuracy of about 96.2 %.

V. Discussion

Breast MRI is the widely accepted diagnostic approach for evaluating the breast. To improve the sensitivity of detecting breast cancer, several diverse techniques are used for breast MRI (21). In particular, dynamic-enhanced MRI provides for evaluating multiple foci of carcinoma in the breast and it displays extremely high sensitivity for identifying breast cancer. However, dynamic-enhanced breast MRI has some disadvantages such as being time-consuming and costly, the possible side effects of the contrast media and the relative low specificity compared to mammography and ultrasonography (26, 27, 28).

Generally in biologic tissues, microscopic motion includes both the molecular diffusion of water and the blood microcirculation in the capillary network, and both diffusion and perfusion affect the ADC values. Because of the extent of micro-vessels in malignant breast tumor, the ADC value can be strongly affected by perfusion when the b value is small. A previous report insisted that b-values less than 750 s/mm2 are most effective for detecting breast tumors (29). However, we used EPI with a b-value up to (800 s/mm2) so we could obtain diffusion effects without significant image distortion.

In addition to conventional MRI, DWI has been reported as a useful technique for the discrimination between benign and malignant breast lesions (17, 21,22). We believe that DWI has a potential role in improving the diagnostic performance of breast MRI. Our findings show that a quantitative analysis of ADC values can be used to distinguish local tumor recurrence from benign breast changes after conservative surgery. In our study, all cases of local tumor recurrence show high signal intensity on DWI and low ADC value on ADC map (Fig.1 and Fig.2) with mean ADC values of 0.95 ± 0.37 x 10^{-3} mm2/s and ADC range of (0.76 – 1.33 x 10-3 mm2/s) which is in accordance with recent study (30).

All cases of post-operative scarring in our study show low signal intensity on DWI and high SI on ADC map (Fig. 3) with high ADC values than local tumor recurrence. The mean ADC values of scars in our study measures 1.66 ± 0.28 x 10^{-3} mm2/s with ADC range of about 1.35 - 1.86 x10-3 mm2/s. Multiple studies (31, 32) stated that postoperative granulation tissue had a high ADC value (2.66× 10^{-3} mm2/s) which in agreement with our study. Recent meta-analysis has determined that an ADC value > 1.2 x 10^{-3} mm2/sec speaks for benignancy (33) and other recent study (34) stated that The average ADC for scar tissue was 1.89 x 10^{-3} mm2/s and ADC range of about 1.43 – 2.20 X 10^{-3} which are in accordance with our results.

All cases of seromas in our study are hypointense on T1W imaging, hyperintense on T2W imaging, and displays smooth peripheral enhancement (< 4 mm thickness) with contrast and show free diffusion with mean ADC values of 2.21 ± 0.15 x 10^{-3} mm2/s and ADC range of (2.13-2.73 x 10^{-3} mm2/s) which in agreement of previous studies (31, 33, 35)

In our study there is one case of hematoma with false positive result on DWI with local tumor recurrence with mean ADC values of 0.39 ± 0.16 x 10^{-3} mm2/s and ADC range of 0.34 – 0.56 x 10^{-3} mm2/s. However the lesion was diagnosed as hematoma from conventional MRI as the lesion displayed hyperintense on T1W imaging, hypointense on T2W imaging, and shows minimal smooth marginal contrast enhancement which in accordance with previous studies (30, 35).

In our case of fat necrosis, enhancement was heterogeneous and associated with oval smooth mass of fat signal intensity. On DWI, it showed low SI on DWI & high SI on ADC map except the fatty area and showed mean ADC values of 1.41 ± 0.26 x 10^{-3} mm2/s and ADC range of (1.22 – 0.161 x 10^{-3} mm2/s) which in agreement with recent studies (30, 36).

In our study, using a cutoff point of 1.35 x 10^{-3} mm2/s the sensitivity, and specificity for DWI in the differentiating local tumor recurrence from benign breast lesions were 100 % and 94.7 %, respectively. The sensitivity & specificity of diffusion WI in differentiating local tumor recurrence from benign breast lesions in our study is in agreement with previous studies (19, 25, 30, 32, 37) which showed the sensitivity & specificity of DWI in the differentiation between benign and malignant breast lesions were ranging from 81% to 97%, and from 80% to 100% respectively.

VI. In Conclusion

DW MR imaging without contrast medium may provide diagnostic ability equivalent to that of contrast-enhanced MR imaging in detection of local tumor

recurrence after breast conservation surgery. The advantage of DW imaging to help visualize local tumor recurrence after breast conservation surgery without the need for contrast medium could be advantageous in women with impaired renal function. DWI is easy to obtain in short scan time and easy to evaluate, and ADC values can differentiate between local tumor recurrence and benign breast changes after breast conservation surgery with high sensitivity & specificity.

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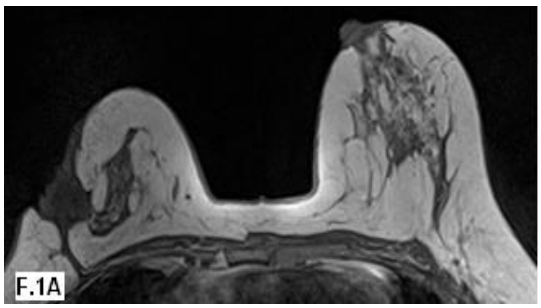
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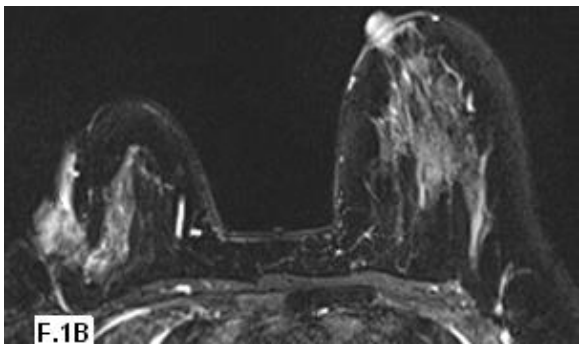
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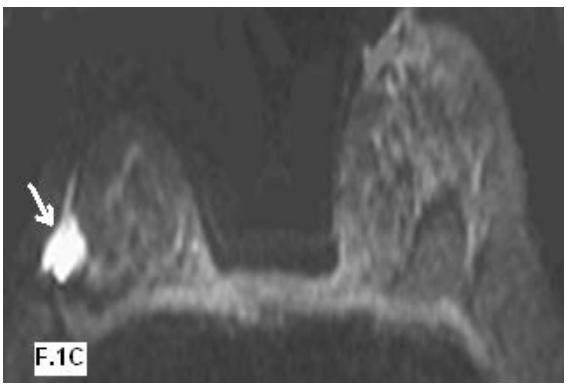
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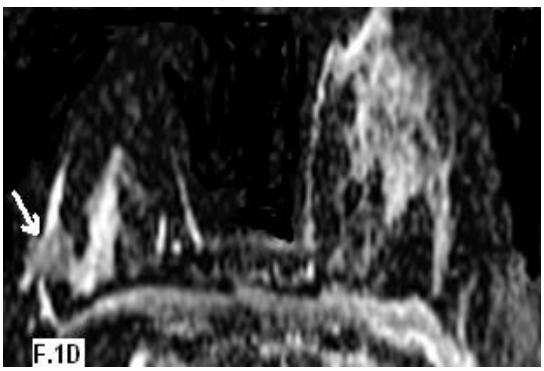
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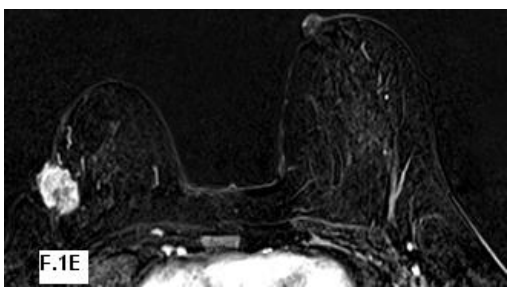
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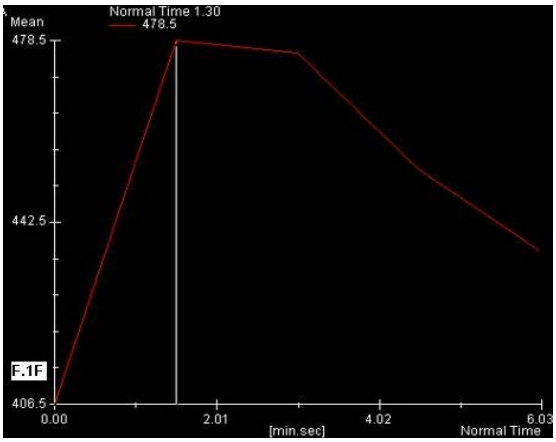
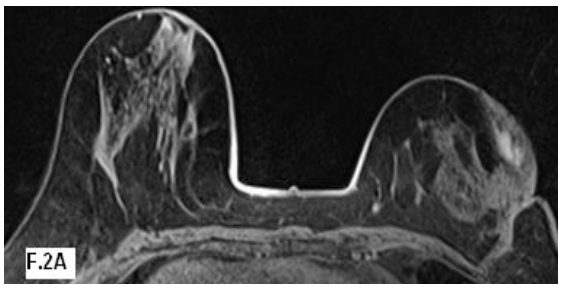
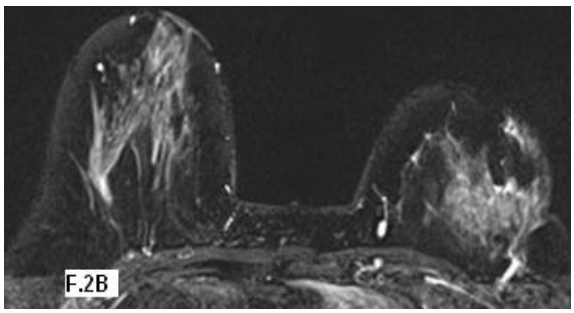
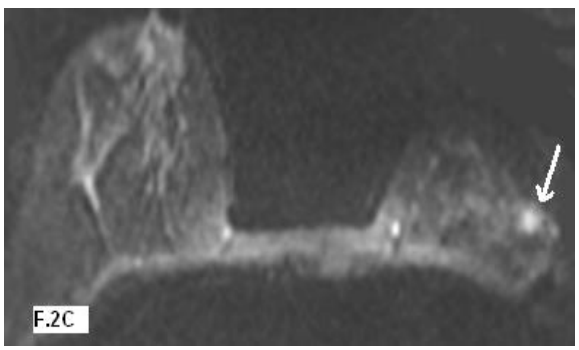
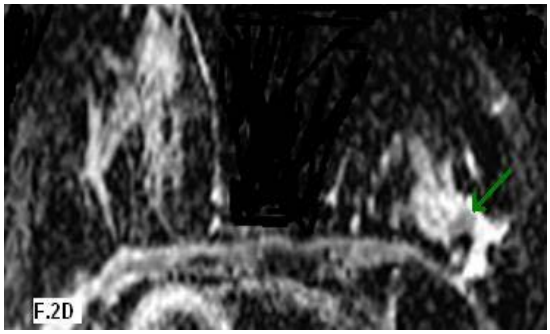


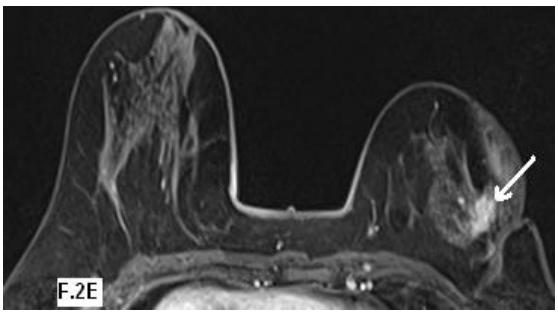
Fig. 1 : Neoplastic recurrence. 48 year-old female submitted to right quadrantectomy 2.5 years ago for invasive ductal carcinoma. (A) Axial T1WI & (B) Axial SITR demonstrate a right breast ill defined mass at the surgical scar. (C) DWI with b= 800 shows a hyperintense mass (arrow). (D) ADC map shows hypointense lesion (arrow) with ADC value of about 1.09 x 10-3 mm2/s. (E) Post-contrast study displsys marked enhancing mass. (F) dynamic curve shows washout curve with peak enhancement at 1.5 minute











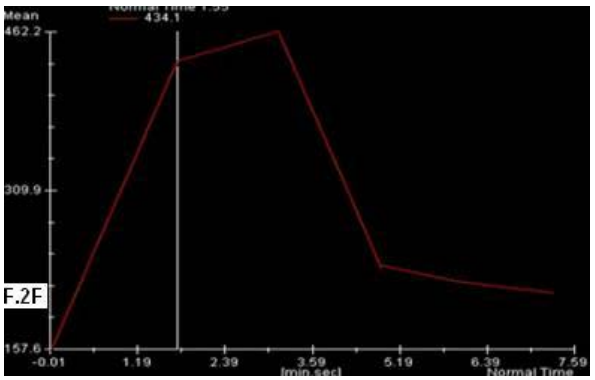
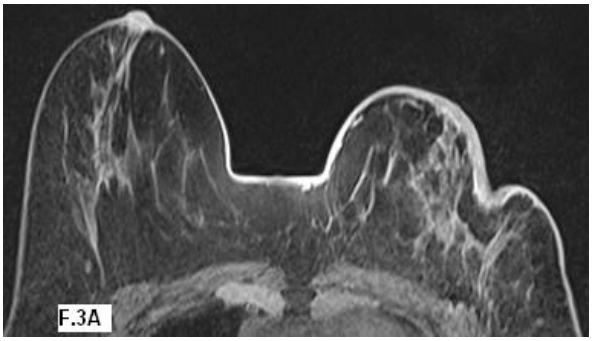
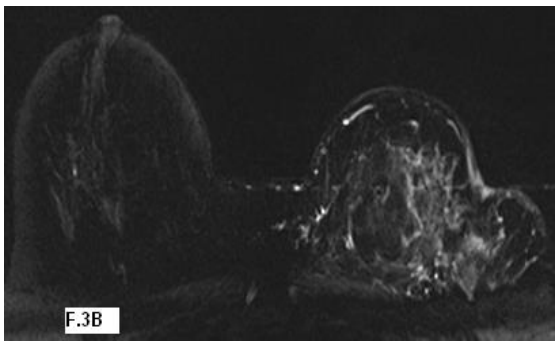
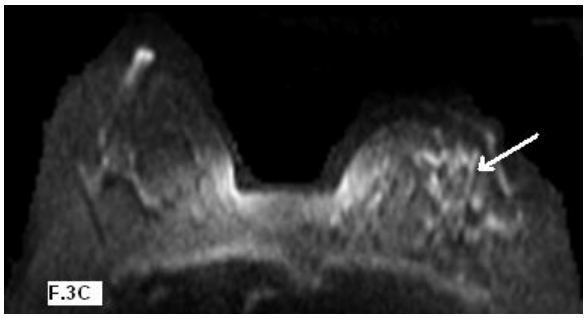
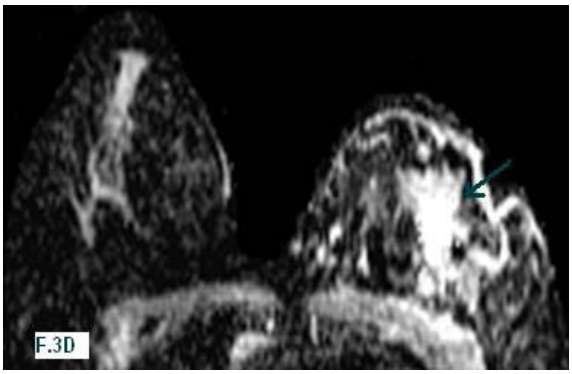


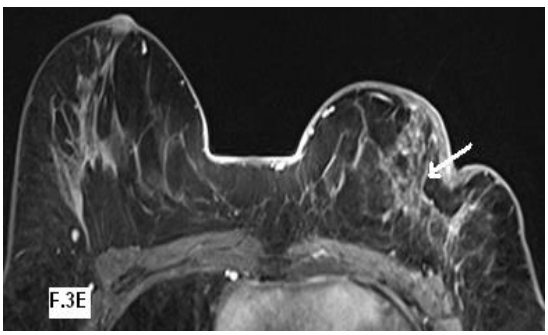
Fig. 2 : Neoplastic recurrence. 53 year-old female submitted to left quadrantectomy 3 years ago for invasive ductal carcinoma. (A) Axial T1 GRE (VIBE) & (B) Axial SITR demonstrate a left breast ill defined lesion at the surgical scar. (C) DWI with b= 800 shows a hyperintense mass (arrow). (D) ADC map displays hypointense lesion (green arrow) with ADC value in the mass is 1.16 x 10-3 mm2/s. (E) Post-contrast study shows marked enhancing mass with minute satellite nodule. (F) dynamic curve shows washout curve











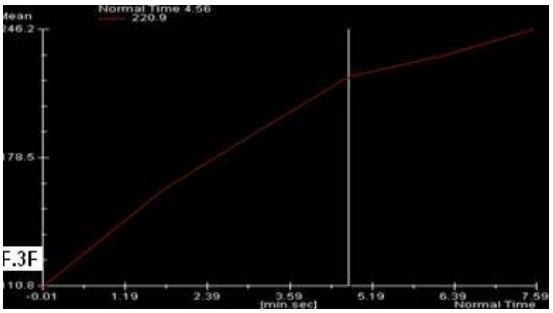
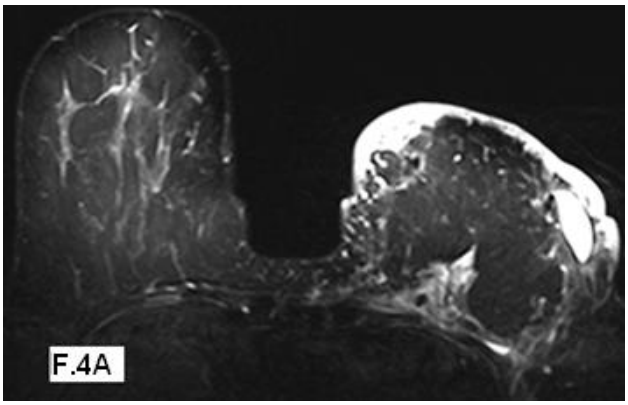
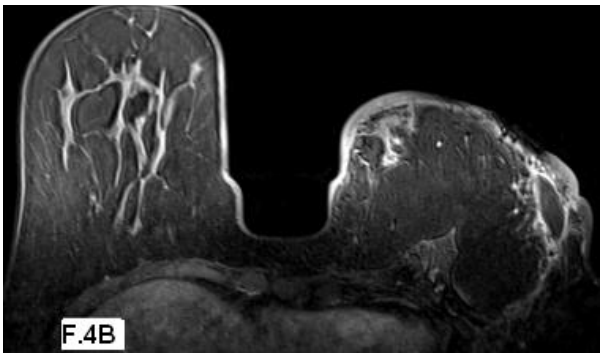
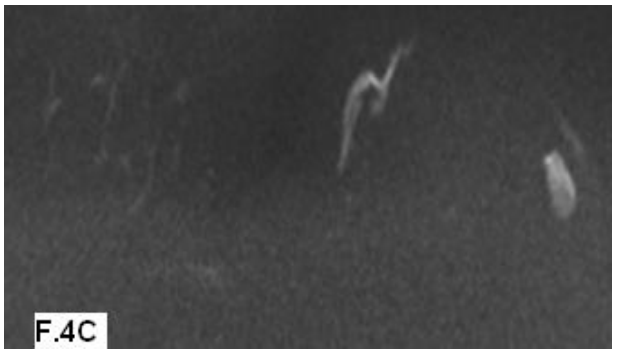


Fig. 3 : Scar tissue. 61 year-old female submitted to left quadrantectomy 1.5 years ago for ductal carcinoma. (A) Axial T1 GRE (VIBE) & (B) Axial SITR demonstrate a left breast ill defined lesion at the surgical site. (C) DWI with b= 800 shows a hypointense ill defined lesion (arrow). (D) The ADC map shows hyperintense lesion (arrow) with ADC value of about 1.68 x 10-3 mm2/s. (E) Post-contrast study shows minimally enhancing lesion (arrow). (F) dynamic curve shows monophasic curve







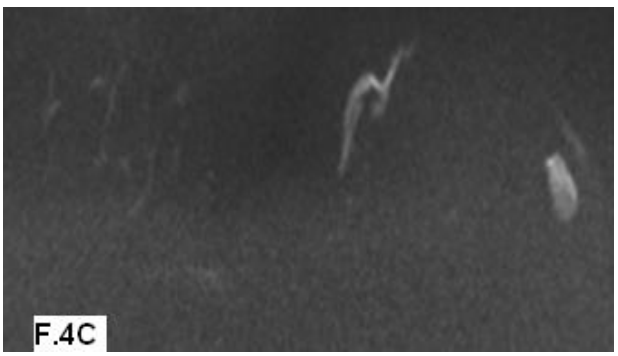
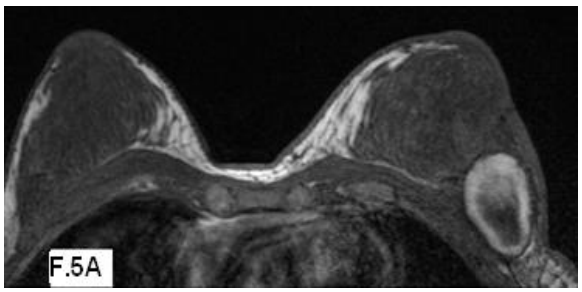
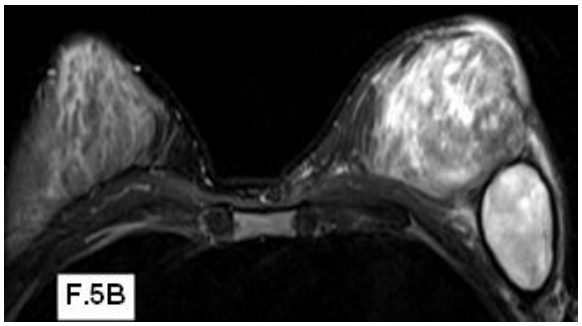
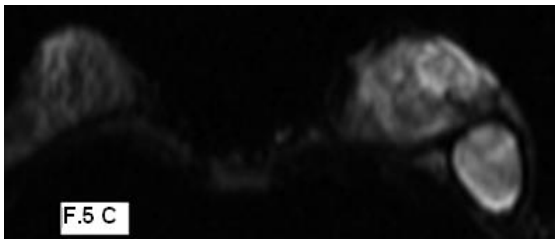
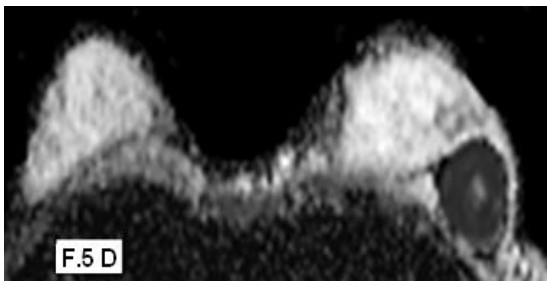


Fig. 4 : Post-operative seroma. 36 year-old female submitted to left quadrantectomy 10 months ago for ductal carcinoma. (A) Axial T2 FS & (B) post-contrast GRE (VIBE) demonstrate left breast fluid collection with surrounding granulation tissue and marked skin edema. (C) DWI with b= 800 shows slightly hyperintense lesion (due to T2 shine through effect). (D) The ADC map shows hyperintense lesion with ADC value of about 2.46 x 10-3 mm2/s









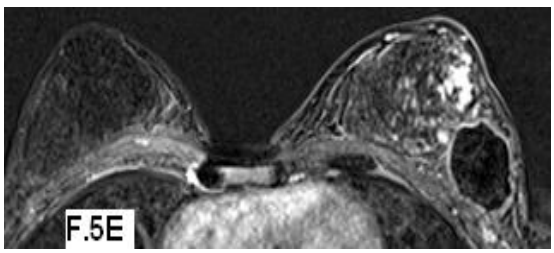
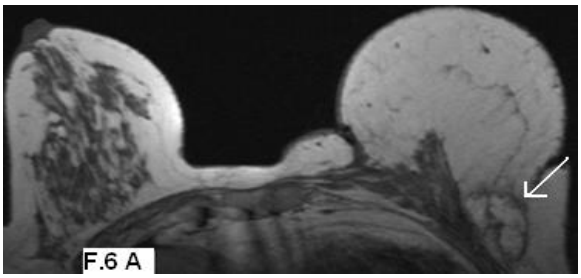
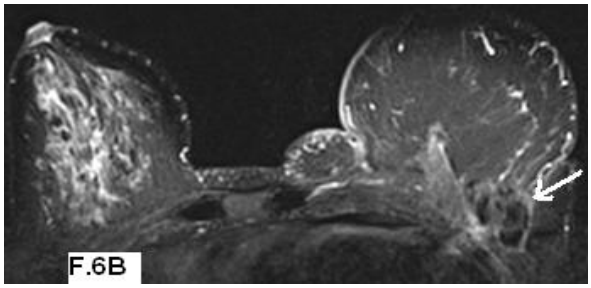
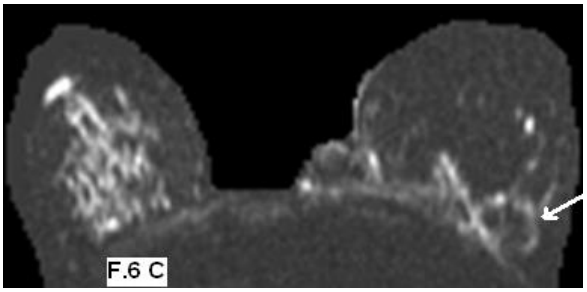
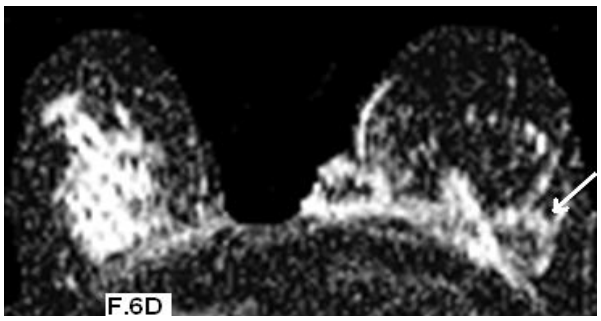


Fig. 5 : Hematoma. 29 year-old female submitted to left lumpectomy 6 months ago for ductal carcinoma. (A) Axial T1WI displays left breast mass of central low signal intensity and peripheral hyperintesnsity, (B) T2 FS demonstrates left breast hyperintesnse mass. (C) DWI with b= 800 shows hyperintense lesion. (D) The ADC map shows hypointense lesion with ADC value of about 0.39 x 10-3 mm2/s. (E) Post-contrast GRE (VIBE) shows marginal enhancement









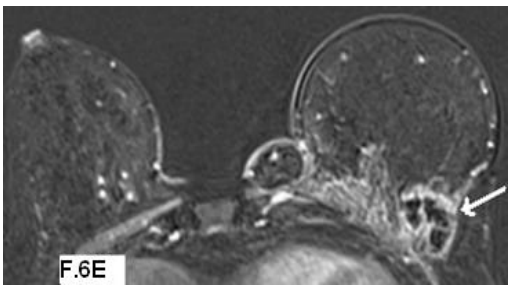


Fig. 6 : Fat necrosis. 37 year-old female submitted to left lumpectomy 11 months ago for ductal carcinoma. (A) Axial T1WI and (B) T2 FS demonstrate left breast lesion of mixed signal intensities with fat areas (arrow). (C) DWI with b= 800 shows mixed signal lesion(arrow). (D) The ADC map shows a lesion with ADC value of about 1.41 x 10-3 mm2/s (arrow). (E) post-contrast GRE (VIBE) shows heterogeneous enhancement (arrow)

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FELLOWS

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- The "FARSM" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall,Ph.D., FARSS or William Walldroff, M.S., FARSM.

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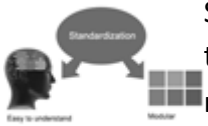

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The MARSM member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

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After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

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- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

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(II) Choose corresponding Journal.

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1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

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Complete support for both authors and co-author is provided.

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The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

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(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

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- One should avoid outdated words.

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Acknowledgements: Please make these as concise as possible.

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The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

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Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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ISSN 9755896