health care and medical consultation. Journal of Telemedicine and Telecare 3:176, 1997. "

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Date Updated : 1999/3/12

Case Number : 69

Main Facility : "Division of Pathology, Central Clinical Laboratory, School of Medicine, Iwate University"

Related Facilities : Iwate Prefectural Kuji Hospital; Labour Welfare Corporation Iwate Industrial Injury Hospital

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Number of Facilities : 2

Practicality : Practical

Date of Start : 1995/12

Date of End :

Status : in progress

Outline : Transmission of pathologic images for intraoperative quick diagnosis and consultation

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Technology - Materials : (1) Iwate Medical College - Kuji Hospital: PATHTRAN 64/64C(Diatoron); (2) Iwate Medical College - Workmen's Accident Hospital: High definition image transmission system (NTT)

Technology - Communication Lines : (1) Iwate Medical College - Kuji Hospital: ISDN(64); (2) Iwate Medical College - Workmens' Accident Hospital: ISDN(64)

Characteristics : PATHTRAN 64/64C captures pathologic images with a CCD camera and transmits them through ISDN 64.

Evaluation : (1) PATHTRAN 64/64C provides good color tone for pathologic images because it transmits RGB images. (2) It is easy to observe the transmitted images because non-interlace CRT for personal computers is used. (3) JPEG-compressed images are transmitted quickly through ISDN (64*2). (4) The system is useful for quick diagnosis and consultation.

Keywords : Quick diagnosis, pathologic images, consultation, ISDN64

References :

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Date Updated : 1999/2/25

Case Number : 70

Main Facility : Seirei Mikatahara General Hospital

Related Facilities : Sakuma Hospital

Number of Facilities : 1

Practicality : Practical

Date of Start : 1995/8

Date of End :

Status : in progress

Outline : As a model project of Shizuoka Pref., a remote medical image diagnosis system was established between Sakuma Hospital and Seirei Sanhoubara Hospital in August 1995. Images have been transmitted through digital circuits at any time as required, and its effectiveness, usage based on the actual state, and improvement plan have been examined. A remote medical image diagnosis system was established between Sakuma Hospital and Seirei Sanhougahara Hospital to transmit images through digital circuits. After the experimental phase from August 1995 to 1997, the system was put into practical use in April 1997 as one of the Shizuoka Prefecture Remote Medical Image Diagnosis Supporting Projects. The images transmitted include plain X-ray photographs, CT images, photographs of affected sites of skin diseases, endoscopic photographs, and electrocardiograms.

Technology - Materials : NTT High Definition Image Transmission System; (1) Seirei Sanhougahara Hospital: Power Macintosh 8100/80, Display (21"), photomagnetic disk device (MK-230E), terminal adapter (NTT-TA Sj-01), telephone (NTT Clover phone); (2) Sakuma Hospital: In addition to the above, camera (Photovision FV10), X-ray film digitizer (VXR-8)

Technology - Communication Lines : ISDN(INS net 64)

Characteristics :

Evaluation : Images of a total of 75 cases were transmitted from July 1995 to August 1996. Among them, 26 cases required emergency consultation: 12 were delivered as an emergency case and 14 were followed. The images of the remaining 49 cases were transmitted for conferences. Pale shadows on the chest X-ray photographs transmitted could not be read. In the current medical insurance system, the supporting hospital can not obtain any compensation. Because only 1 terminal was installed at the supporting hospital, it is difficult to respond to the inquiries of various specialties.

Keywords :

References :

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Case Number : 71

Main Facility : "Department of Pathology, Tohoku University Hospital"

Related Facilities : Public hospital of Kesennuma

Number of Facilities : 1

Practicality : Practical

Date of Start : 1994/9

Date of End :

Status : in progress

Outline : Application of remote pathologic diagnosis (tele-pathology) to intra-operative quick diagnosis

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Technology - Materials : NTSC method

Technology - Communication Lines : ISDN(INS64)

Characteristics : Stationary image

Evaluation : Because transmission capacity is small, only stationary images can be transmitted with NTSC method. The quality of the images transmitted is not so good. However, this system is effective in consideration of the distance between Sendai and Kesennuma. It may be useful for the regions where few pathologists work. Transmission method and devices have to be further improved.

Keywords : tele-pathology, ISDN, and quick diagnosis

References : T. Sawai et. al: Telepathology of Local district for Constructing Network in Japan - Diagnosis of Intraoperative Frozen Sections via Telepathology with INS64 and NTSC -. 10th International conference of Diagnostic Quantitative Pathology

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Date Updated : 1999/3/4

Case Number : 72

Main Facility : "Department of Pathology, Tohoku University Hospital"

Related Facilities : Sendai City Hospital

Number of Facilities : 1

Practicality : Experimental

Date of Start : 1991/7

Date of End : 1993/7

Status : finished

Outline : Remote pathologic diagnosis (tele-pathology): evaluation of the equipment for it through consultation and examination about the problems in putting it into practice

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Technology - Materials : High vision

Technology - Communication Lines : Optical fiber

Characteristics : Dynamic pictures (in real time)

Evaluation : Increased transmission capacity allowed the transmission of dynamic pictures. The high vision system provided sufficient color and resolution. The problems of this system include a smaller field of view than microscopic images and expensive cost. It is expected that the cost of the system will lower by maintaining the infrastructure for it and developing the devices for it.

Keywords : Tele-pathology, optical fiber, high vision

References : Analytical and Quantitative Cytplogy and Histology (AQCH) Vol. 10 1997 (in press)

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Date Updated : 1999/3/15

Case Number : 73

Main Facility : "First Department of Pathology, Hamamatsu Medical University"

Related Facilities : FUJINOMIYA CITY GENERAL HOSPITAL

Number of Facilities : 1

Practicality : Practical

Date of Start : 1996/8

Date of End :

Status : pause

Outline : Microscopic images are transmitted from Fujinomiya Hospital to Hamamatsu Medical College for intra-operative quick diagnosis.

Technology - Materials : PATHTRAN 64

Technology - Communication Lines : ISDN64

Characteristics : It has been regularly used twice a week.

Evaluation : Fujinomiya Municipal Hospital highly rates this system. The transmission speed of images is fair. Because microscopes cannot be manipulated by remote control, it is important to match the technical level of the technician of the Fujinomiya Hospital to that of the physician responsible for diagnosis in the Hamamatsu Medical College.

Keywords :

References :

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Date Updated : 1999/3/15

Case Number : 74

Main Facility : "Tokyo Women's Medical University, Department of Radiology "

Related Facilities : "Tokyo Women's Medical University, Aoyama Hospital, Department of Radiology "

Number of Facilities : 1

Practicality : Experimental

Date of Start : 1995/4

Date of End : 1997/3

Status : proceeding

Outline : Construction of a tele-radiology using a high-speed communication circuit, B-ISDN (150Mbps), and its clinical evaluation based on the multi-media joint experiment with NTT. This experiment was designed to extract and evaluate the problems associated with the clinical use of the remote image conferences through high speed communication circuits. A system that consisted of image display stations (capacity: 14GB), image servers (7GB), and image acquisition stations was established in the department of radiology, Tokyo Women's Medical College Hospital (main hospital) and its affiliated Aoyama Hospital (Aoyama hospital). The system of the 2 hospitals was linked with the personal B-ISDN provided by NTT through an ATM switch. In the main hospital, CT images (Proseed SA by Geyms) were captured to the system through the acquisition station and other images through a film digitizer (LD-4500 by Konica) and the acquisition station. In the Aoyama hospital, CT and MR images are captured from existing TDIS to the system through the acquisition station. It is possible for one hospital to quickly search for the information in the image server of the other hospital and display it on the display. Since images other than those captured by the film digitizer have all information, display conditions can be adjusted and CT values and distance be measured on the display station. It is also possible to attach clinical information and diagnostic reports to images as audio information, add pointers and markers on images, and make tone or simple spatial frequency processing on the display station. In a conference using E-mails, a physician who asks consultation registers images with clinical information on its own server. In a dialog-style conference, a physician who receives consultation quickly transmits images, pointers, audio information, and the view of the conference through the ATM switch and B-ISDN so that the conference could progress smoothly. All images are transmitted uncompressed.

Technology - Materials : Main hospital: UNIX SPARC20 for control and image display, 3 UNIX SPARC5s for image display, 2 UNIX SPARC5s as image acquisition station, and image server (capacity: 14GB); Aoyama hospital: 1 UNIX SPARC20 for control and image display and image server (capacity 7GB)

Technology - Communication Lines : ATM switch, B-ISDN (156Mbps)

Characteristics : (1) Images and audio information can be transmitted smoothly and quickly with B-ISDN and ATM switch. (2) Since CT and MR images have all image data, CT values can be measured, window

setting be changed, and various measurements be made. (3) It is possible to refer to the server of the counterpart almost in real time.

Evaluation : (1) Mail- and conference-style experiments of the above system were conducted. The images mainly used included chest CT, chest plain X-ray photographs, and the CT and MR images of bone soft parts. (2) Image transmission speed is acceptable in practical use, and does not cause any stress in participants of conferences. (3) Because the image diagnosis system could not be handled smoothly, it was modified by changing its viewer to Radworks (Medical Applicare, Netherlands) and its server to DICOM server.

Keywords : B-ISDN, ATM switch, remote image conference

References :

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Date Updated : 1999/3/12

Case Number : 75

Main Facility : "Department of Pathology, Nagoya University Hospital"

Related Facilities : "Toki General Hospital, Toki, Gifu; Nakatsugawa Municipal Hospital, Nakatsugawa, Gifu; Nagoya Kyoritsu Hospital, Nagoya"

Number of Facilities : 3

Practicality : Practical

Date of Start : 1994/8

Date of End :

Status : in progress

Outline : Since August 1994, a remote pathologic diagnosis system by transmitting stationary images through public telephone circuits has been operated between the department of pathology, Nagoya University Affiliated Hospital and associated hospitals without full-time pathologists. After the experimental use in about 50 cases with the Toki Municipal General Hospital, Gifu Prefectural Tajimi Hospital, and Nakatsugawa Municipal Hospital, the system was put into practical use. Subsequently, the Prefectural Tajimi Hospital was replaced with Nagoya Kyoritsu Hospital because a full-time pathologist was stationed in the Tajimi Hospital. This system has been mainly used to assist young inexperienced pathologists, including postgraduates, dispatched to the above hospitals in patients requiring intra-operative quick diagnosis. This system has also been used to confirm pathologic diagnoses for the presentation at the meetings of associations, review previous cases, and give advice to cytodiagnostic screeners. It has been used in about 300 cases. Using this system, we gave a lecture to the students of the Tottori University Medical School as a part-time lecturer on May 22, 1997.

Technology - Materials : Pathtran 1000 (Diatoron)

Technology - Communication Lines : Public telephone line (ISDN net 64)

Characteristics : This system provides a network between the department of pathology, Nagoya University Affiliated Hospital and related remote hospitals. It allows the communication not only between the base and terminal hospitals, but also between the terminal hospitals. In fact, remote diagnosis and its assistance using the system have been made between the linked hospitals. Because public telephone circuits are used, it can be introduced and managed easily.

Evaluation : (1) Remote pathologic diagnosis by transmitting images: The system has been used in about 300 cases mainly for intra-operative quick diagnosis. Remote diagnoses based on transmitted images agreed with subsequent histologic diagnoses in more than 90% of patients. Examining the remaining patients showed that most of them were under-diagnosed and over-diagnosis was rarely noted. No patient received any drawbacks because the relevant hospitals discussed clinical treatment when such a remote diagnosis was made. Efforts have been made to avoid misdiagnosis. For that purpose, the pathologists who handle this system are

limited to the specialists with the experience of 10 years or longer, and pathologists and clinicians closely discuss all diagnoses. Moreover, all remote diagnoses are confirmed with subsequent histologic examination of their permanent samples. This system is useful for making a diagnosis and contributes to local medicine because pathologists are lacking and a full-time pathologist cannot be stationed at all remote hospitals. The remote diagnosis using transmitted images seems as accurate as or better than normal intra-operative quick diagnosis probably because of more careful examination and sufficient communication with clinicians. (2) Remote lecture by transmitting images: The remote lecture by transmitting images is the first trial, and requires further examination. Although the system transmits only stationary images, it does not matter because normal lectures also use stationary images alone. The quality of images has to be improved, but even high definition images cannot always provide sufficient quality when the level of the lecture is too high and images do not help make students understand. Going to a remote university as a part-time lecturer is a burden to a pathologist in terms of time and cost. The image transmission system can solve this problem. It would be ideal to give a lecture by transmitting dynamic pictures bi-directionally. Such a system does not require high definition images, and is considered technically possible. (3) Future use: This system will be used for remote pathologic diagnosis until a full-time pathologist will be sent to the hospitals because it is required by the communities around the hospitals and its contribution to local medicine and accuracy are highly rated. The remote lecture will be continued next year. It is necessary to develop an easier method for students to understand.

Keywords : Remote pathologic diagnosis, stationary images, public telephone circuits, remote lecture

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Date Updated : 1999/2/26

Case Number : 76

Main Facility : "Department of Neurosurgery, Iwate Medical University"

Related Facilities : Labour Welfare Corporation Iwate Rosai Hospital

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Number of Facilities : 1

Practicality : Practical

Date of Start : 1996/9

Date of End :

Status : in progress

Outline : Transfer of angiographic DSA, helical CT (3D), γ-camera, and pathologic images: a total of 6 circuits (3*2) of INS64

Technology - Materials : Two sets of the TV conference system by NTT, "Face Mate Series, FM-2100" were used. Each set was connected with 3 circuits of INS64. The 2 sets contained 2 monitors and 1 video camera. Conversations can be made over the system. Each image is transferred by changing its control monitor output to NTSC mode by a converter. However, some frames are not transferred because images are compressed according to the International Standard Coding Method and transferred at 364 kbit/sec.

Technology - Communication Lines : INS 64 x 3 circuits

Characteristics : Angiograms can be transferred in a bi-directional, simultaneous manner between the department of neurosurgery, Iwate Medical College and the angiography room of the Iwate Workmen's Accident Hospital through 3 circuits each of INS64 per direction. Because images are transferred at NTSC level, they are not so clear. However, conversations can be made in real time. The requirements for transmitted images should be further examined.

Evaluation : Because 3D CT was installed in the university, the image transfer system of the Iwate Workmen's Accident Hospital has not been used as frequently as before. However, hospitals around the Workmen's Accident Hospital sometimes use the system. The images transferred are unclear.

Keywords :

References :

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Date Updated : 1999/3/5

Case Number : 77

Main Facility : "Department of Medical Information science, Faculty of Medicine, Kyushu University"

Related Facilities : "University of Missouri-Collumbia, Kanntou Teisin Hospital"

Number of Facilities : 2

Practicality : Practical

Date of Start : 1990/4

Date of End :

Status : in progress

Outline : Pathologic diagnosis by the remote transmission of stationary color images. There are few pathologic specialists who can make diagnosis about a pathologic finding, such as immune rejection of a transplanted organ. Pathologists at remote places are asked to make quick diagnosis of an important biopsy sample for determining a postoperative therapeutic principle: they differentiate rejection from inflammation, or determine the condition of blood circulation. Remote diagnosis of biopsy samples was performed 8 times postoperatively in the cadaveric hepatic transplantation performed in the Kyushu University Affiliated Hospital. The results confirmed the effectiveness of the remote diagnosis.

Technology - Materials : Microscopic camera, A/D conversion, data compression, data transmission, personal computer

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Technology - Communication Lines : Transmission of digital signals through public telephone circuits

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Characteristics : This system helps saving patients' lives by making the best use of a few pathologic specialists in Japan.

Evaluation : Diagnosis can be made as soon as samples have been stained. The change in therapeutic policy is conveyed as necessary. The image quality of the system is sufficient for the biopsy sections of transplanted tissues. How to manipulate the system can be learned in 30 minutes.

Keywords : Organ transplantation, remote pathologic diagnosis

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References :

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Date Updated : 1999/2/24

Case Number : 78

Main Facility : "First Department of Pathology, Tottori University, Faculty of Medicine, Section of Clinical Pathology, Tottori University Hospital (Back-up)"

Related Facilities : "Matsue City Hospital (Shimane), Tottori Prefectual Kousei Hospital (Tottori), Shobara Res-Cross Hospital (Hiroshima), Kure Mutual -Aid Hhospital (Hiroshima), Nara Prefectual Medical College "

Number of Facilities : 4

Practicality : Practical

Date of Start : 1993/7

Date of End :

Status : in progress

Outline : The equipment was installed in the pathologic laboratory in the Kure Kyosai Hospital. In the other hospitals, the equipment was installed in the pathologic laboratory and operation room. The equipment was also installed in the department of pathology, Tottori University Affiliated Hospital as a backup (since March 1997). The equipment was put into practical use for intra-operative quick diagnosis in Matsue Municipal Hospital in July 1993, in Tottori Prefectural Kosei Hospital in March 1997, and in Shobara Red-Cross Hospital in April 1997. The equipment was put into practical use for the consultation of renal transplantation in the Kure Kyosai Hospital in July 1993.

Technology - Materials : (1) Microscopic specimen camera: Hitachi, DK-7001, (2) Image transmitting equipment: NTT, VM-64, (3) Monitor TV: Victor, TM-210S, (4) Image recorder: Optical filing disk, (5) Telephone for conference

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Technology - Communication Lines : INS net 64

Characteristics :

Evaluation :

Keywords :

References : "Ito H et al, Histopathological Diagnosis of the Transplanted Kidney with Static Video-Image Transmitted System : Is Telepathology Available for Transplant-Pathology?, Japanese Journal of Transolantation 29: 97-103, 1994."

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Date Updated : 1999/3/12

Case Number : 79

Main Facility : Kawai Chuo Shinryosho

Related Facilities :

Number of Facilities : 4

Practicality : Practical

Date of Start : 1994/4

Date of End :

Status : in progress

Outline : This system was started as a cooperation network of health, medicine, and welfare. At first, information was transmitted mainly as E-mails. Subsequently, a resident data server was installed, and information is now transmitted through a C/S type LAN. Although this system is not applicable to remote medicine, there are cases where physicians make diagnoses using the video images of bedsore or skin eruptions taken by helpers.

Technology - Materials : CPU- 20 Apple Macintosh Personal Computers. Input device: videos, scanners, and digital cameras

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Technology - Communication Lines : LAN-Ethernet. Optical fibers (a total of 1.5Km) were installed for the departments located more than 1,500m apart.

Characteristics : "Yuitori Network System," a software product developed by ourselves with a 4D server. This is a useful high- and multi-function software relevant to the community.

Evaluation : (1) Telephone circuits and ISDN(64) were used before optical fibers were installed. However, the system was not used frequently because communication speed was too low. Transmitting information seems not so practical. (2) The software has been updated almost daily to increase utility. (3) A simple input system was installed this year. Text information can be input by clicking 3 or 4 sites on the display.

Keywords : Yuitori Network, Cooperation of health, welfare, and medicine, 4D, 4th dimension

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Date Updated : 1999/3/8

Case Number : 80

Main Facility : Nagoya Midori Dental Association Homepage

Related Facilities : Nagoya Midori Dental Association

Number of Facilities :

Practicality : Experimental

Date of Start : 1994/4

Date of End :

Status : in progress

Outline : The images of cases in various special fields of dentistry are presented as files on the board in the local BBS of medical professionals' associations mainly consisting of local dentists' associations, and are used for case examination and education.

Technology - Materials : Public telephone circuit

Technology - Communication Lines :

Characteristics :

Evaluation :

Keywords :

References :

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Date Updated : 1999/3/14

Case Number : 81

Main Facility : Amano Dental Office

Related Facilities : Ichinose Dental Office; Ichiki Dental Office; Koshiishi Dental Office; Yamada Dental Office; Siguma Systems

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Number of Facilities : 5

Practicality : Experimental

Date of Start : 1996/11

Date of End :

Status : in progress

Outline : Uniform data for correcting teeth (age, sex, face photographs (enlarged photos of mouths of front, side, laughing, and expressionless faces), cephalo-valve, PA, Ortu-panoramagraphy, cephalo-analysis [Sockut], VTU, Lowe Arch VTU, Super imporsion, and therapeutic schedule) were examined, and used for a therapeutic guide for patents under treatment.

Technology - Materials : Mac 8100/80AV, Supra Fax Modem 288

Technology - Communication Lines : Public telephone circuits

Characteristics : At first, a host computer was continuously linked with each client. However, because it took too much time for sending and receiving image information, a home page was opened to provide image data in an inexpensive manner.

Evaluation : Because image data are transmitted in the form of GIF, their quality will not be so good. In consideration of the current status of the participating hospitals, XP cannot be examined in detail even when it is enlarged.

Keywords : Corrective treatment

References :

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Case Number : 82

Main Facility : Shiratori Dental Office

Related Facilities : Station Dental Office;Swan Dental Office Sakae;Donko Dental Office

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Number of Facilities : 3

Practicality : Practical

Date of Start : 1996/9

Date of End :

Status : in progress

Outline : Share and accumulation of information (including images) of the participating clinics using a groupware product, "Lotus Notes 47J." Promotion of BPR

Technology - Materials : A personal computer with Windows 95 was installed at each clinic as a

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Technology - Communication Lines : client. A server machine (Win-NT) was installed at the headquarters.

Characteristics : ISDN

Evaluation : N. P.

Keywords : Because the data of images are large, the smart media of digital cameras are used except for emergency. This system has been effective for sharing and accumulating the information about routine jobs. The future issue is the education of users.

References :

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Date Updated : 1999/3/15

Case Number : 83

Main Facility : Hokkaido University Hospital

Related Facilities : Nakashibetsu Town Hospital

Number of Facilities : 1

Practicality : Practical

Date of Start : 1988/11

Date of End :

Status : pause

Outline : CT images obtained in Nakashibetsu Municipal Hospital were digitized and transmitted through public telephone circuits (9600bps) and MediFile 1000 (NEC) installed in the 2 hospitals. Radiologists of the Hokkaido University Affiliated Hospital examine the images on the CRT of Medifile 1000, make reports, and send them back.

Technology - Materials : MediFile 1000 (NEC), film digitizer, irreversible compression (about 1:10)

Technology - Communication Lines : Public telephone circuits (9600bps)

Characteristics : Because public telephone circuits are used, transmission speed is low.

Evaluation : The images of 2 to 5 CT examinations are transmitted in a week.

Keywords : Tele-radiology

References : "Satoshi Terae et al. : Telephone line transfer using a local filing system in Hokkaido. Computer Methods and Programs in Biomedicine 36: 151-156, 1991"

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