Case Number : 35

Main Facility : Kyoto Prefectural University of Medicine

Related Facilities : Sakazaki Clinic; National Health Insurance Notogawa Hospital; National Health Insurance Notogawa Hospital; National Health Insurance Kumihama Hospital; Torii Hospital

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Number of Facilities : 5

Practicality : Practical

Date of Start : 1994/4

Date of End :

Status : in progress

Outline : A system that receives MR, CT, and RI images from an affiliated clinic and remote hospitals with DICOM 3.0 for primary diagnosis has been designed and operated. The affiliated clinic is Sakazaki clinic, and remote hospitals include Notogawa Hospital (80km away), Yosanoumi Hospital (180km away), Kumihama Hospital (200km away), and Torii Hospital (100km away). Now, diagnosis is made based on both CRTs and films to prevent misdiagnosis.

Technology - Materials :

Technology - Communication Lines : INS1500 (University - Sakazaki Clinic), INS64(2B) (University - Notogawa Hospital, Yosanoumi Hospital, Kumihama Hospital, and Torii Hospital)

Characteristics : Because DICOM 3.0 is used for communication protocol, the system does not restrict image devices and makers.

Evaluation : The actual speed of INS 64 was about 114 Kbps, and that of INS1500 was about 1196Kbps. The transmission through INS 64 took about 11 minutes per case, and cost about 300 yen as telephone charge. It is necessary to approve the clinical application of image compressing techniques and compressed images. INS allowed TV-conference among 3 institutions (image sharing).

Keywords : Tele-radiology, ISDN, DICOM3.0, Image compression

References :

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Date Updated : 1999/2/24

Case Number : 36

Main Facility : Suzuka University of Meducal Science

Related Facilities : "Departmemt of Rehabilitation, Suzuka Kaisei Hospital; Infromation Policy Division, Department. of Reagional Development, Mie Prifecture; Policy Coordination Division, Suzuka City; Cable Net Suzuka Co. Ltd. ; Corporate Public System Division, Matsushita Electric Industrial Co. Ltd. ; TOSHIBA Corporation"

Number of Facilities : 6

Practicality : Experimental

Date of Start : 1996/7

Date of End : 1999/3

Status : in progress

Outline : The development of at-home rehabilitation instruction supporting system has been attempted (for hand therapy). The system architecture using the information network, such as cable TV and public telephone circuit, for instructing and supporting remote patients requiring at-home rehabilitation is discussed for the following 3 aspects: (1) the system for the instruction and support of remote rehabilitation (REHA-Adviser): problems and requirements are examined for the system in which patients' houses and medical institutions are connected with networks to perform the effective at-home rehabilitation by providing the environment equivalent to face-to-face rehabilitation; (2) the system for supporting at-home rehabilitation (REHA-Training): enjoyable and effective at-home rehabilitation is supported, and problems and requirements are examined to make up a system that allows patients to confirm the effect of training and trainers to confirm the progress of training as required; (3) Group rehabilitation supporting system (REHA-Group): trainees are allowed to communicate with each other so that they could be encouraged mutually. Trainers can confirm the progress of training as required. For the time moment, experiments will be performed for the above (1) and (2). The above (3) will be started depending on the results of (1) and (2).

Technology - Materials : (1) Using existing local communication networks (CATV, NTT's public circuit, and INS64), terminals are installed that can bi-directionally transmit pictures and voices in real time. (2) Personal computers are used to create training software and human interfaces to support the training of individuals. (3) AI, virtual reality, and three-dimensional graphics are used for the processing system of personal computers.

Technology - Communication Lines : CATV, NTT's public circuit, and INS64

Characteristics : This system is designed to enable remote patients to perform rehabilitation training at home. Local cooperation system is important. This experiment is the result of the cooperation of the medical facilities, local government, and CATV companies in this region, and is also significant as a local study.

Evaluation : This study mainly covers the functions of at-home therapeutic exercises as medical care and includes functional

integration training as welfare. The basic function as a new evaluation method during operation is to disclose data that have been used only by experts of medicine and welfare to trainees themselves in an understandable manner.

Keywords : Community care, telecommunication, rehabilitation, hand-therapy

References :

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Date Updated : 1999/3/17

Case Number : 37

Main Facility : "Department of Pathology, Yamagata University School of Medicine"

Related Facilities : Yamagata Prefectural Shinjo Hospital; Yamagata Prefectural Kahoku Hospital

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Number of Facilities : 1

Practicality : Practical

Date of Start : 1990/4

Date of End :

Status : in progress

Outline : (1) Transmission in premises (500m distant between the hospital and the department of pathology). (2) Only technicians are stationed at the pathologic section of the laboratory. The members of the department of pathology are responsible for diagnosis. (3) Designed for quick intraoperative diagnosis

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Technology - Materials : (1) Receiving equipment: receivers, monitors, remote manipulation device for microscopes (personal computer, NEC PC 9801). (2) Transmitting equipment: full-automatic microscopes (Olimpus AHBS), high-vision TV camera (HC-1000), and monitor, CCU, and transmitter (Ikegami Telecommunication Equipment)

Technology - Communication Lines : Personal optical fiber

Characteristics : High definition image (high-vision), real-time transmission (dynamic picture), remote manipulation of microscopes, and transmitting ability of the objective images of 1 magnification or higher

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Evaluation :

Keywords : High quality TV, optical fiber, dynamic picture transmission, remote manipulation of microscopes

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References : "(1)Fuse T et al. :Real-time microscopic image transmission system for prompt histopathological diagnosis. 8th Japanese-Korean Joint Conference of Clinical Pathology. Sapporo, Jun. 1990. (2)SATO Y et al, Multi-Center Evaluation of Showa Disk Susceptibility to Presumptively Determine Minimum Inhibitory Concentrations through Linear Regression Analysis, Jpn J Clin Pathol 39: 429-436, 1991."

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Date Updated : 1999/3/8

Case Number : 38

Main Facility : "Department of Pathology, Yamagata University School of Medicine"

Related Facilities : Yamagata Prefectural Shinjo Hospital; Yamagata Prefectural Kahoku Hospital

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Number of Facilities : 1

Practicality : Experimental

Date of Start : 1994/9

Date of End : 1994/10

Status : finished

Outline : (1) Remote pathologic diagnosis (30km distant). (2) No full-time pathologist in the prefectural hospital (external pathologist comes 3 days a week)

Technology - Materials : NTSC stationary image system (Terumix Nicon), remote manipulation device for microscopes, image storage device

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Technology - Communication Lines : INS net 64

Characteristics : NTSC TV, high-speed digital circuit, image storage device

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Evaluation : Operation: Diagnosis of cases requiring quick diagnosis, consultation of cytodiagnosis from screeners, consultation from inexperienced pathologists, and review of past tissue samples. Evaluation of utility: effective for consultation in tissue and cell diagnosis. There remain hardware-related problems, including (1) time-consuming extensive microscopic examination (especially at low magnification), (2) unclear nuclear chromatin structure (especially at high magnification), and (3) complicated manipulation and occasional troubles

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Keywords : NTSC television, high-speed digital circuit, stationary image transmission, remote manipulation of microscopes, image storage

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Case Number : 39

Main Facility : "Department of Pathology, Yamagata University School of Medicine"

Related Facilities : Yamagata Prefectural Shinjo Hospital; Yamagata Prefectural Kahoku Hospital

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Number of Facilities : 1

Practicality : Experimental

Date of Start : 1994/11

Date of End : 1994/12

Status : finished

Outline : (1) Remote pathologic diagnosis (65km distant) (2) No full-time pathologist in the prefectural hospital (an external pathologist comes twice a week)

Technology - Materials : NTSC stationary image system (Terumix Nicon), remote manipulation device for microscopes, image storage device

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Technology - Communication Lines : INS net 64

Characteristics : NTSC TV, high-speed digital circuit, image storage device

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Evaluation : Operation: Diagnosis of cases requiring quick diagnosis, and consultation of cytodiagnosis from screeners. Evaluation of utility: (1) Useful for emergency diagnosis (during or not during operation) when no pathologist is available; (2) Effective for cytodiagnosis from screeners; (3) Allows the surgical department to make a schedule without considering the schedule of pathologists. Problems: (1) Macro-image transmitting device is required; (2) NTSC transmission is limited at both low and high magnification; (3) Capacity is not enough for Net 64; and the capacity of the laboratory technicians of the transmitting side is limited (In this case, good team play was obtained with a competent pathologist).

Keywords : NTSC television, high-speed digital circuit, stationary image transmission, remote manipulation of microscopes, image storage

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Date Updated : 1999/3/8

Case Number : 40

Main Facility : Shutoken Health Administration Center

Related Facilities : "Department of Ophthalmology, Kanto Teishin Hospital"

Number of Facilities : 1

Practicality : Practical

Date of Start : 1995/5

Date of End :

Status : in progress

Outline : As the society has aged, potential patients with adult diseases have recently been increasing. Various signs of adult diseases develop in arteries, and the fundus oculi is the only site where arteries can be observed directly. Therefore, photographic diagnosis with a mydriasis-free fundus camera has become important. However, since the number of ophthalmologists is limited, photographs are sent by mail to them for diagnosis. This system is remote fundus oculi image transmission system in which images captured by CCD connected with a fundus camera and stored in a personal computer are transmitted to the computer of a mote ophthalmologist for diagnosis.

Technology - Materials : 2 personal computers (main body, 17-inch display, expanded hard disk, MO, video capture board, ISDN camera), mydriasis-free fundus oculi camera, CCD camera

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Technology - Communication Lines : One ISDN (Net 64) circuit

Characteristics : Because the system is an asynchronous storage type, an ophthalmologist can access stored images at any time. Because database is used, diagnostic data can be easily controlled, and various retrievals be made.

Evaluation : The number of diagnoses has almost reached 5000 since the experimental operation of the system was started 1.5 years before. This system reduced the time to report diagnostic results, and allowed other departments to cooperate with ophthalmologists in treating patients. Therefore, the system has been rated improvement for both patients and medical staff.

Keywords : Fundus photographs, CCD, personal computer, ISDN, database, asynchronous transmission and storage

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References : "Synsuke Yoshida et. al: The Fundus oculi Tele-ExaminationSaupport System, 905-906, 1995, Proceedings of the 15th conference in medical informatics inJapan, 1995 "

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Case Number : 41

Main Facility : "Department of Public Health and Environmental Science, School of Medicine, Tokyo Medical and Dental University"

Related Facilities : patients' home

Number of Facilities : 20

Practicality : Experimental

Date of Start : 1990/11

Date of End : 1993/6

Status : finished

Outline : Dynamic picture color TV phones were installed at the homes of patients receiving care at home. Physicians and subjects of rehabilitation made medical and rehabilitation evaluations over the phone, and the physicians made instructions about the life and rehabilitation at home. A total of 20 homes received this system. The TV phone was qualitatively and quantitatively evaluated to examine the potential effect of TV phone on at-home care.

Technology - Materials : Fujitsu IS-100

Technology - Communication Lines : INS 64 net

Characteristics : To evaluate whether dynamic picture TV phone is useful for at-home care, this experiment was performed in patients who now receive care at home.

Evaluation : We invited the participants to this study among old people who receive care at home because of basic disease and their family members. TV phone was installed at a total of 20 families for 3 to 5 months per family. Network was established between the family and university (physician and physical therapist), and communication was made at regular intervals for medical check, health instruction, and rehabilitation. Before the system was installed, we visited the families to fully know their health conditions and living environment so that accurate evaluation could be made at renewal. Each case was evaluated according to the evaluation scale of rehabilitation etc. at initial, intermediate, and end stage of the experiment. The best use of dynamic picture color TV was found to provide quality care and help the families promote the recovery and enhancement of health as well as enhance quality of life.

Keywords : Dynamic picture color TV, at-home care

References : " (1) Takano T, Nakamura K, Akao C 「Assessment of the value of videophonos in home healthcare」 Telecommunications Policy Vol. 19;41-248, 1995 (2) Image diagnosis of health in cities; Tokyo Healthy City. T. Takano, K. Ishidato, M. Nagasaki eds. Formulation and Development of a Roscarch Base for Healthy Cities 1992. Tokyo; Kyoiku Syoseki, 50-67 "

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Date Updated : 1999/2/28

Case Number : 42

Main Facility : "Department of Public Health and Environmental Science, School of Medicine, Tokyo Medical and Dental University"

Related Facilities : "Division of Community Nursing, School of Allied Health Sciences, Tokyo Medical and Dental University; HARUECHO Clinic, Edogawa, Tokyo"

Number of Facilities : 3

Practicality : Experimental

Date of Start : 1993/6

Date of End : 1994/3

Status : finished

Outline : Using an image processing communication unit including dynamic picture color TV, a communication network was established between the homes of disabled old people (4 sites in the Tokyo metropolitan area) and special institutions involved in local care (rehabilitation physicians, public health nurses, home doctors, etc.). The system was operated in cooperation with a local at-home care supporting center. Based on case studies, the system was evaluated for the effect on comprehensive at-home care supporting system.

Technology - Materials : Fujitsu IS-100

Technology - Communication Lines : INS 64 net

Characteristics : Multiple special institutions involved in at-home care were connected with a network. An experiment was performed about the actual use of TV phone in the medical and welfare linked network.

Evaluation : We invited participants among the old people and their families, who had an underlying disease and received at-home care from the care center or a clinic. It was decided that a TV phone was installed at a total of 6 cases for 3 months per case. The network connected the families, clinics, and university (Department of senile nursery and public health), and communication was made at regular intervals (2 phones at a patient's home and 4 in at-home care related institutions). Before installation, joint visits were made for the target families to determine the policy of support over the TV phone. Evaluation results and communication records were made as a whole using an electronic filing system. At the end of the experiment, a questionnaire survey was conducted for those who handled the TV phone about the quality of at-home care over TV phone, operability of TV phone, and future method of TV phone. The result showed that TV phone in the actual health-welfare linked network was effective.

Keywords : Dynamic color TV phone, at-home care supporting system, local care network

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References : "Keiko Nakamura et al:Comprehensive Home Health Care Saysytem Employing Multimedia and the Effect of a Model Network Project, Proceedings of the 14th conference in medical informatics in Japan, 497-500, 1994 "

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Date Updated : 1999/2/28

Case Number : 43

Main Facility : "Department of Public Health and Environmental Science, School of Medicine, Tokyo Medical and Dental University"

Related Facilities : "Division of Community Nursing, School of Allied Health Sciences, Tokyo Medical and Dental University; Itabashi Care Center for the Aged, Itabashi, Tokyo"

Number of Facilities : 2

Practicality : Experimental

Date of Start : 1994/4

Date of End : 1996/3

Status : finished

Outline : Existing local care service for at-home patients is combined with at-home care service with a dynamic picture color TV phone. At-home care staff (public health nurses, physical therapists, work therapists, language therapists, case workers, and helpers) were used to evaluate practical and effective use of at-home care service based on case studies.

Technology - Materials : Fujitsu VS-700

Technology - Communication Lines : INS 64

Characteristics : The effectiveness of the at-home care supporting system with a dynamic picture TV phone was evaluated in the field. An experiment was performed to show various ways to make the best use of a TV phone in the field.

Evaluation : We invited participants among the old people and their families, who had an underlying disease and received at-home care from the care center. It was decided that a TV phone was installed for a total of 16 cases for 3 months per case. The network connected the each of the families, care center, and university (Department of senile nursery and public health), and communication was made at regular intervals. At-home care staff highly rated the system because it helped provide quality care. Particularly, language therapists reported that the system was effective for the training of communication disorder.

Keywords : Dynamic picture color TV phone, tele-care

References :

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Date Updated : 1999/2/28

Case Number : 44

Main Facility : "Department of Public Health and Environmental Science, School of Medicine, Tokyo Medical and Dental University"

Related Facilities : "Division of Community Rehabilitation, Daito Health and Welfare Center, Daito, Osaka; Health Services Facility to the Aged - TATSUMANOSATO, Daito, Osaka"

Number of Facilities : 2

Practicality : Experimental

Date of Start : 1995/8

Date of End :

Status : in progress

Outline : The usage experience of dynamic picture TV phone between remote places (Ohsaka and Tokyo) are accumulated. The effective method of using at-home care supporting system with dynamic picture TV phone is examined in senile health institutions that play an important role in future at-home care in Japan.

Technology - Materials : Fujitsu VS-700

Technology - Communication Lines : INS 64

Characteristics : This is an experiment to evaluate the effectiveness of dynamic TV phone in care management. For that purpose, the responsible department of the local government involved in at-home care provided rehabilitation service using TV phone from senile health institutions.

Evaluation : We invited participants among the old people and their families, who had an underlying disease and received at-home care from the department of rehabilitation, Daito City, or day service of a senile health institution, "Tatsumanogo". A TV phone was installed for a total of 4 families for 3 months per family. The network connected the each of the families, the senile health center, and univcrsity. Remote rehabilitation was performed over the TV phone, and the results were evaluated. At the same time, staff members of the senile health institution (physical and language therapists) made rehabilitation. TV phone was found to allow daily monitoring after care management and quick response to the change in the medical condition of patients.

Keywords : Dynamic color TV phone, tele-care, care management, remote rehabilitation

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Date Updated : 1999/2/28

Case Number : 45

Main Facility : Toranomon Hospital

Related Facilities : Toranomon Branchi Hospital

Number of Facilities : 1

Practicality : Practical

Date of Start : 1994/4

Date of End :

Status : in progress

Outline : Intraoperative quick diagnosis system for supporting surgeries at remote hospitals by transmitting image data from a CCD camera equipped with a microscope.

Technology - Materials : NIKON Microphoto SA microscope, High resolution CCD camera HQ1600 (equivalent to 2 million pixels), high-vision TV

Technology - Communication Lines : ISDN

Characteristics : Remote pathologic diagnosis using image data of high definition high-vision TV

Evaluation : This hospital has 2 branch hospitals in Minato Ward, Tokyo and Takatsu Ward, Kawasaki city, Kanagawa Pref. The 2 hospitals are located about 1-hour away. Only the main hospital has pathologic laboratory. When the branch hospital needed intraoperative quick diagnosis, an experienced pathologist and technician would went to the branch hospital. However, an inexperienced pathologist and technician now goes to the branch and transmits image data to the main hospital to discuss them and make final pathologic diagnosis. The quality of the images was comparable to that of the actual view of a microscope, and acceptable for diagnostic purpose. However, mechanical troubles of the equipment (failure to start, inability to transmit image data, failure by ON/OFF of the power supply) frequently occurred. It took much time to fix them even when the manufacture was notified immediately. Therefore, it was not reliable as medical equipment. Moreover, since this equipment was developed by Nikon with its own specifications, the operation procedures are too complicated for pathologists, which frequently caused troubles by incorrect operation. We have asked the manufacturer to correct these problems, but their response was poor. Compatibility with other manufacturers' equipment has not been considered at all. Because the system can be connected only with the pier-to-pier system using ISDN, the connection to computer networks, such as Internet, is not taken into consideration at all. The overall evaluation was fair.

Keywords : Remote medicine, quick pathologic diagnosis

References :

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Date Updated : 1999/3/8

Case Number : 46

Main Facility : Ota amemorial Hospital

Related Facilities : innnoshima Medical Association Hospital;

Number of Facilities : 27

Practicality : Practical

Date of Start : 1986/10

Date of End :

Status : in progress

Outline : Close cooperation between remote and specialized hospitals is essential for acute cerebral stroke or head injuries requiring emergency surgery. This CT image transmitting system transmits clear CT images quickly over general telephone circuits, and allows the discussion between 2 remote places. Now, 28 medical institutions in Hiroshima and Nagasaki prefectures are linked to form a network, and the network contributes to the medicine for local communities as Broad Medical Network for Emergency Cerebral Diseases. Remote hospitals can receive the help of experts at any time in terms of image diagnosis and decision making for surgical indication, the need to deliver a patient, and therapeutic policy. Therefore, this system contributes not only to medical staff, but also to residents in remote places. We have transmitted data of a total of 3, 559 patients for 10 years since the system was put into practical use in October 1986.

Technology - Materials : Because image signals from CT equipment are directly input, clear images can be transmitted and the procedures and time for transmitting data be reduced. Because a FM transmission system with high-speed 8 bit A/D and D/A converter is used, 1 image can be transmitted in 45 seconds without the deterioration of image quality. The system can be easily operated with the buttons on the front panel. The physician at one side can discuss 4 selected images displayed on the monitor with the physician at the other side. Picsend R (NTT) using ISDN circuits was introduced in June, 1994. Although data are input with a camera, this system transmits images quickly because ISDN circuits are used. It also allows users to talk while transmitting images. Because it has TV phone function, the physician at one side can see and talk with the physician at the other side. It is also possible to transfer the image information prepared by the staff of remote hospitals.

Technology - Communication Lines : Telephone circuits (analog, ISDN)

Characteristics : Unnecessary transmission of images is reduced, and only selected images requiring advanced special medicine, such as those of surgery, are transmitted. This promotes the functional sharing among the hospitals on the network, and makes it possible to start special treatment in the early stage of diseases.

Evaluation : Broad Medical Network for Emergency Cerebral Diseases using a CT image transmission system is now operated among 28 medical institutions. The images of more than 3, 000 cases have been transmitted on the network. However, the CT image transmitting system is one of the measures to transmit images. Human network

based on daily close cooperation and reliance among physicians is essential for operating this network.

Keywords : CT image transmitting system, medical cooperation, Broad Medical Network for Emergency Cerebral Diseases

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References :

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Date Updated : 1999/3/13

Case Number : 47

Main Facility : Yoshida General Hospital

Related Facilities : "Department of Medical Informatics, Kyoto University Hospital, BBCC (Association of Broadmand-ISDN Business chance &Culture Creation)"

Number of Facilities : 1

Practicality : Experimental

Date of Start : 1994/4

Date of End :

Status : in progress

Outline : Using a medical image network system through ISDN (tele-pathology), intraoperative quick pathologic diagnosis has been made between the Welfare and Health Association's Yoshida General Hospital's pathologic laboratory and operation room and the Second Department of Pathology, Hiroshima University Medical School.

Technology - Materials : A medical image network system jointly developed by Inohara Industries and NTT is used. Image transmitting device: Vm-64 (NTSC system) of NTT, High definition color monitor: PVM-20440 by Sony, Storage device: MO disk drive (MK-128D of Mitsubishi Kasei), Photographing equipment: 2 CCD cameras (XC-009 of Sony) (for microscopy and organ photography), and facsimile (for receiving and sending order form and diagnostic report)

Technology - Communication Lines : ISDN

Characteristics : Because ISDN is used, it is possible to ask advice from the institutions that use the same equipment (pathologists and other specialists), and to discuss results with pathologists.

Evaluation : A network was established among the pathologic laboratory and operation room of this hospital, and the Second Department of Pathology, Hiroshima University Medical School to make intraoperative quick diagnosis. Full-time pathologists are stand-by, and diagnosis can be made as required. Moreover, using the terminal in the operation room, the diagnostic result can be directly reported from a pathologist to a surgeon, while watching images at the same time.

Keywords : Remote medicine, tele-pathology, ISDN

References :

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