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EDITORIAL GROUP
The Essential Science indicators compile statistics on the numbers of publications each academic institutions from world wide. The average numbers of citations is the important indicator of academic performances. The higher education evaluation center of Taiwan keep the close observation on the ESI performances of universities in Taiwan, and carry out the overall rankings.

According to the results on the numbers of publications from the 2009 Taiwan Essential Science Indicators, there are 31 universities from Taiwan entered the ESI and reached the top 1 % on various subjects of studies in academic performances, dynamic indictor on subjects of studies, and influence relatively on subjects of studies. Among them, I-Shou university since last year’s first entered the ranking, the fields of engineering made the great progress and ranked the 17th on the national performances.

I-Shou University under the leading of President: Dr. Fu Shen-Li, not only the administrative affair of school has spread fast over the years, the academic also has excellent performances, and earned the world wide fame that attract many foreign students to study at I-Shou university. The I-Shou university also established the foreign languages speaking only international college this year.

According to the results of ESI publication statistic on Taiwan, the numbers of publications from I-Shou has reached over 1424, and the number of publications citation is 4532. Publications from I-Shou university is ranked 1527, progressed up from 1639 on previous year. According to the results of ESI publication statistic on Taiwan, the numbers of publications from I-Shou has reached over 1424, and the number of publications citation is 4532. Publications from I-Shou university is ranked 1527, progressed up from 1639 on previous year.
Success in building a green campus

I-Shou University earned the title of 「model school of green campus」by the Ministry of Education

I-Shou University, besides having a beautiful campus, great effort was devoted into campus energy conservation. The effort on environmental sustainable development had a concrete result recently. I-Shou university is one of the 13 selected universities as the 「model school of green campus」by the ministry of education.

The 13 universities under the invitation form the ministry of education, has sign the international acknowledged environmental sustainable development declaration. 「The Talloires Declaration」. This symbolized that all the universities in Taiwan will put their effort toward environmental conservation and environment sustainable development.

I-Shou university is able to participated in the Tallories Declaration that stretch over 40 or more countries, exceeded more than 350 world wide universities symbolized the effort I-Shou university put in was being confirmed. This also mean I-Shou university will continued to connect internationally. The
mission is to put great efforts in building a green campus, and to create a high quality learning environment in southern Taiwan.

I-Shou university not only put the “green concept” on the administrative, educative and research perspectives, 「campus recycle subcommittees」 was set up to give impetus on energy saving in campus. The idea is to increase the reuse of water, and natural resources. Students also carry out the exercises on purify mountains and natural resources during their club activities. Faculty on campus vigorously concentrates their attention on the research of ecological conservation. The department of civil ecological engineering carry out research on the microclimate and urban heat island. The department of mechanical and automation engineering also researched and developed a commuter bus that reduced the pollution of carbon dioxide. This demonstrated how all the members from the university are trying to help the activities on the global energy conservation.
Endoscopic Surveillance and Treatment of Esophageal Cancer from High Risk Group

Wen-Lun Wang,1 Ching-Tai Lee,1 Tzer-Zen Hwang,2 Chih-Chun Wang,2 Yu-Jen Cheng,3 Jau-Chung Hwang,4 Chi-Ming Tai,1 Chi-Yang Chang,1 and Jaw-Town Lin1

1Departments of Internal Medicine and General Medicine, 2Otolaryngology, 3Thoracic Surgery, and 4Pathology, E-DA Hospital

Abstract

Identification of high-risk population and adequate surveillance of esophageal squamous cell carcinoma (ESCC) are crucial, because early detection of ESCC may alter treatment planning and improve survival. Since, there is a tremendous advance in endoscopic diagnosis of ESCC, including Lugol chromoendoscopy and narrow band image system, endoscopic surveillance of ESCC among high risk population becomes feasible. However, a comprehensive protocol for endoscopic surveillance and treatment of esophageal cancer is still lacking.

The preliminary report of this study revealed that in patients with head and neck cancer (HNC) underwent endoscopic surveillance, 25.7% have second primary esophageal cancer, and 55.6% of these lesions were superficial ESCC. Vice versa, patients with ESCC also have a risk of 12% (3 out of 25) with coexistent HNC. The patients with second primary cancers were significantly younger than those with ESCC or HNC alone (48.8 vs. 58.2 vs. 54.6 years). Our results also confirmed the efficacy and safety of endoscopic submucosal dissection (ESD) in the treatment of early ESCC. Only one complication of esophageal stricture developed after ESD.

It is concluded that synchronous cancers are not uncommon in patients with head and neck cancer or ESCC, and all of them play an important role in the prognosis. A routine protocol of
sequential and detailed endoscopic surveillance from oropharynx to esophagus should be utilized, especially in younger patients with HNC or ESCC. If early ESCC was detected, ESD is a good choice of treatment.

**Introduction**

Esophageal cancer is one of the most common malignancies in the world, and is the ninth leading cause of cancer death in Taiwan. Despite esophageal squamous cell carcinoma (ESCC) is rapidly decreasing in western countries, it remains the predominant histology type of esophageal cancer in Asia. In Taiwan, more than 90% of esophageal malignancies are squamous cell carcinomas, and there are around 1,300 newly diagnosed cases annually. ESCC is a highly aggressive malignancy with a 5-yr survival rate of less than 20%. Regardless of some advances in surgical techniques and chemo-radiation therapy, the prognosis for esophageal cancer has improved little. The reasons for such a disappointingly low survival rate can be attributed, at least in part, to ineffective screening tools and guidelines, with the result that most patients have late stage or unresectable diseases at presentation. Therefore, augmented strategies for early detection should be made to reduce the morbidity and mortality of this cancer.

On the other hand, an increasing trend of incidence of head and neck cancer (HNC) was also found over the past decades in Taiwan. According to the literatures, around 10-20% of patients with HNC have synchronous ESCC. When a second esophageal cancer occurs in a patient with HNC, the prognosis is generally determined by the ESCC which is usually dismal.

In recent years, advanced endoscopic techniques, such as narrow-band imaging (NBI) and Lugol chromoendoscopy, enable early detection of esophageal cancer and precancerous lesions. If early ESCC was detected, it can be treated by endoscopic submucosal dissection (ESD), which is a minimally invasive therapeutic modality and has gradually become the standard of treatment for superficial ESCC, especially in Japan. When the tumor is locally advanced, chemoradiation therapy (CRT) followed by surgery is considered. Therefore, with the advances of endoscopic techniques, a sequential, and multidisciplinary approach of endoscopic surveillance and treatment for ESCC in high-risk population is warranted. The aim of this study was to investigate the efficacy and establish a protocol of endoscopic surveillance, and treatment of ESCC for high risk population.

**Subjects and methods**

1. We prospectively recruit subjects with high-risk for esophageal cancers in E-Da Hospital, and divided into four groups: (A) patients with typical esophageal symptoms suggesting esophageal cancer, such as progressive dysphagia, odynophagia, etc. (B) betel nut user,(C) esophageal cancer, after treatment by CRT, esophagectomy or ESD, (D) patients with head & neck cancer (HNC) before or at present.

2. All subjects received a series of three endoscopic examinations in a single session in the following order: conventional endoscopy
(white-light), NBI, and Lugol chromoendoscopy.
3. All subjects with newly diagnosed ESCC will be referred to ENT doctors for check-up of the buccal and ENT field.
4. Finally, the treatment modalities will be suggested according to the AJCC staging guideline and a multidisciplinary discussion.

**Results**

1. Endoscopic surveillance:
   One hundred and fifty-one consecutive patients fulfilled the study criteria. Three were excluded from analysis owing to complete obstruction by hypopharyngeal tumors. The results of endoscopic surveillance for these 148 high-risk patients are showed in Table 1. All patients with typical esophageal symptoms (Group A) were found to have advanced ESCC. Three (5.6%) patients with betel quid chewing and without symptoms or past history (Group B) were found to have ESCC. All of them were superficial cancers. One had early and another one had advanced ESCC in 4 patients with esophageal cancer after treatment by CRT, esophagectomy or ESD (Group C). In patients with head and neck cancer underwent routine endoscopic screening (Group D), 25.7% has second primary esophageal cancer. Among them, 10 out of 18 (55.6%) were superficial ESCC and 8 were advanced cancer. Vice versa, patients with newly diagnosed ESCC were referred to ENT department for check-up, and have a risk of 12% (3 out of 25) for developing HNC.

2. Treatment of ESCC:
   After diagnosis of ESCC, 15(34.8%) were superficial cancers (Table 2.). Seven (46.7%) patients were treated by endoscopic submucosal dissection (ESD). Fig. 1 demonstrated an example of superficial ESCC detected by endoscopy with NBI system and resected with ESD. After ESD, one developed complication of post-ESD esophageal stricture, and none have perforation nor massive bleeding. Totally 16 patients with early (N= 2) and advanced (N=14) ESCC, received

<table>
<thead>
<tr>
<th>Case (N=148)</th>
<th>Group A (N=21)</th>
<th>Group B (N=53)</th>
<th>Group C (N=4)</th>
<th>Group D (N=70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESCC (N=43)</td>
<td>20 (95%)</td>
<td>3 (5.6%)</td>
<td>2 (50%)</td>
<td>18 (25.7%)</td>
</tr>
<tr>
<td>Superficial</td>
<td>0</td>
<td>3 (100%)</td>
<td>1 (50%)</td>
<td>10 (55.6%)</td>
</tr>
<tr>
<td>Advanced</td>
<td>20 (100%)</td>
<td>0</td>
<td>1 (50%)</td>
<td>8 (44.4%)</td>
</tr>
</tbody>
</table>

Group A: patients with typical esophageal symptoms suggesting esophageal cancer, such as progressive dysphagia, odynophagia, etc.
Group B: betel nut user,
Group C: esophageal cancer, after treatment by CRT, esophagectomy or ESD,
Group D: patients with head & neck cancer (HNC) before or at present.
esophagectomy, and one died of post-operation sepsis.

3. Demographic characteristics in patients with ESCC, HNC alone and synchronous or metachronous cancers

We further compared the patients of synchronous or metachronous ESCC with those of ESCC or HNC alone (Table 3.). The patients with second primary cancers were significantly younger than those with ESCC or HNC alone (48.8 vs. 58.2 vs. 54.6 years).

**Discussion**

Since there is a tremendous improvement in endoscopic diagnosis of ESCC including Lugol chromoendoscopy and NBI system, endoscopic surveillance of ESCC among high risk population...
Fig. 1 A case of superficial ESCC receiving ESD:

(a) Conventional endoscopy: The early ESCC lesion is difficult to detect.
(b) Narrow band image (NBI) system: The early ESCC lesion became a brownish area.
(c) Lugol chromoendoscopy: The ESCC lesion appears an unstained area.
(d)–(F) The procedure of endoscopic submucosal dissection (ESD)

becomes feasible. Moreover, various endoscopic therapies including endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) are advocated as an alternative therapy for superficial ESCC. Our results also confirmed the efficacy and safety of ESD in the treatment of early ESCC.

Patients with HNC have a high prevalence of second primary squamous cell carcinoma in the esophagus. Because these cancers have similar epidemiological risk factors, including smoking, alcohol drinking, and betel quid chewing. This phenomenon might be explained by the concept of “field cancerization”, and deserves repeated emphasis. Our study showed 25.7% of patients with HNC have second primary esophageal cancer, where are slightly higher than western and Japanese literature. Because esophageal cancer spreads aggressively, patient survival is adversely affected. Therefore, identification of any predisposing conditions for second primary ESCC in patients with head and neck cancers may alter treatment planning and improve survival.

In this study, patients with second primary cancers were significantly younger than those with ESCC or HNC alone is an interesting finding. Some genetic backgrounds may predispose these patients to squamous cell carcinoma in the aero-digestive tract. Further genetic studies for these patients are necessary and will be conducted in our hospital in the near future.

Conclusion

Based on this study, we knew that synchronous cancers are not uncommon in patients with head and neck cancer or ESCC, and all of them play an important role in the prognosis. There-
fore, the importance of a sequential and detail endoscopic surveillance from oropharynx to esophagus should be emphasized, especially in younger patients. This project is still ongoing in E-Da Hospital. The results of long-term follow-up will be proposed in the future, and a recommendation of the protocol of endoscopic surveillance and treatment for esophageal cancer in high risk population will be made after the project.

References

The Development of RFID Tracking System for Medicare Applications

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Abstract

The negligence of leaving the swab in patient’s body after operation is one of the common errors in the domestic medical institutes, which not only jeopardizes patient’s life but also results in another operation for removing the swab. Radio Frequency Identification (RFID) as the new generation of tag system is designed to replace the barcode system. Due to its simplicity and ubiquity, RFID has been paid much attention on in recent years. The new applications of RFID include medical record tracing and patients, pets, and cattle tracking. For the avoidance of leaving the swab in patient’s body, a brand new design of swab with RFID tag embedded is proposed in this project.

Among the advanced, tiny, and personalized medical instruments, the Wireless Capsule Endoscopy (WCE) is considered to be a successful commercialized product and plays an important role in medical industry. WCE is an invasive treatment to observe the inside of stomach and intestines, especially for the examination of tumor. Unfortunately, current WCE can not offer the information of precise position of tumor in patient’s belly. Hence, an auxiliary positioning control system by cooperating RFID is proposed to bring WCE into full play. Furthermore, the images taken by WCE need an effective and efficient image processing system to help doctor to identify all the abnormal phenomena of intestines.

(From left) Assistant Professor Wei-Cheng Lin, Associate Professor Po-Ying Chen, Professor Yu-Jung Huang and Assistant Professor Tsung-Long Pan
**Introduction**

RFID is the most famous ubiquitous identification technology and has been applied in logistic, positioning, financial authentication, and medical industry [1~3]. Be aware of its importance, RFID is dedicated to be the trend of technology strategy within next 5 years in Taiwan. The aim of U(Ubiquitous)-Taiwan project, the successor of E-Taiwan and M-Taiwan projects, is to construct the infrastructure of island-wide ubiquitous service to support Taiwan becomes the center of RFID industry and create an amount of 70 billion NTD in 2013 [5]. The application of RFID in medical industry has been gathered global attention [6~11]. According to the report of Frost & Sullivan consultative institute, the amount of RFID in medical and health industry is 0.36 billion USD in 2004 and is anticipated to reach 2.3188 billion USD in 2011.

The beginning of using RFID in medical industry in Taiwan was during the break out of Severe Acute Respiratory Syndrome (SARS) in 2003. Ton-Yen General Hospital in Shin-Chu used RFID for real-time tracking of patients and staffs to avoid internal affection. Hereafter, Taipei Medical University Hospital implemented a RFID tracking system to against SARS in 2004. Taichung Hospital implemented a RFID tracking system for phthisis patients. Kaohsiung Veterans General Hospital used RFID for intensive care unit (ICU) patients’ identification and tracking. So far, there are medical institutes, National Taiwan University Hospital, National Cheng Kung University Hospital, Chang Gung Medical Foundation, Tri-Service General Hospital, Wan-Fang Hospital, and Taichung Hospital, had implemented RFID in identification, positioning and monitoring, physical monitoring, process control, entrance guarding, and logistic and transportation. RFID can help medical institute for management to prevent valued assets or medicine from getting trashed and provide a useful tools for case history tracing, patients tracking, and real-time physical monitoring.

The information content and operation condition of RFID tag are different for varied applications in medical industry. For a specified application, only when RFID tag can tackle the specified environmental conditions, the performance of dedicated RFID system can be guaranteed.

**RFID Technology Overview**

Radio frequency identification (RFID) technology uses radio waves to automatically identify physical objects. An RFID system usually consists of three major components: the tag, the reader and the back-end system. Communication of data between tags and a reader is by wireless communication. Two methods distinguish and categorize RFID systems, one based upon close proximity electromagnetic or inductive coupling and one based upon propagating electromagnetic waves. As shown in Fig.1, the reader emits electromagnetic waves that induce a current in the tag’s antenna, which powers the chip on the tag. When the power to the tag’s chip passes a minimum voltage threshold, the circuit turns on and the tag transmits its information to the reader. RFID uses radio waves that are generally between the frequencies of 30 KHz and 5.8 GHz as shown
RFID systems can be classified on the basis of the spectrum they operate in. Although spectrum use varies depending on national regulation, governments around the world have been trying to harmonize frequency allocation for RFID. In the United States, the ISM bands (Industrial, Scientific and Medical) are the dominant frequencies for RFID, namely: 13.553–13.567 MHz (center frequency 13.560 MHz), 433.05–434.79 MHz (center frequency 433.92 MHz), 902–928 MHz (center frequency 915 MHz), 2.400–2.500 GHz (center frequency 2.450 GHz), 5.725–5.875 GHz (center frequency 5.800 GHz. The typical communication range is ranging from 3m to 10m. Even within a frequency band, the communication range of RFID systems varies widely, because range is dependent on antenna design, system power, transponder power consumption, and receiver sensitivity. The software tools such as VC++, VB, PB, BCB are commonly used for the development of RFID API (Application Programming Interface).

In most regions of the world, RFID systems can be used in the low frequency (LF), high frequency (HF) and ultra high frequency (UHF) parts of the spectrum. The use of RFID in the LF (125-134 MHz) and HF (13.56 MHz) bands is
harmonized across regions, whereas RFID operation in the UHF band is not. The differences in UHF operations stem from the allowance of power levels, communication speed, and shared frequency bands. The United States and Canada typically use 915 MHz, whereas Europe uses 868 MHz. Fortunately, though, most UHF RFID tags can function in both bands, with a slight hit on performance. Table 1 summarizes characteristics of the different RFID frequency bands with their corresponding application area.

**RFID has some unique characteristics**

RFID offers more generous reading areas and tag positioning tolerance than optical scanning of bar codes. RFID Tags can even be read through many, but not all materials, highest reading rates result from approximating line-of-sight between tag and the reader’s antenna. The extra data content of RFID Tags provides for tracking and accounting of each individual object.

RFID reading is not affected by the size and the shape limit of the tag. In addition, RFID tag can be developed into small and diverse patterns in order to use in different products.

The RFID tag can be designed for applications in harsh environments. It can make the tag waterproof and dustproof and is resistant to immersion in water, alcohol, or oil, RFID in the dark or dirty environment can also read/write the data.

RFID tag can be reused. Because RFID is transmitted by electronic data, it can be overwritten repeatedly and tags may also be recycled. Such as passive RFID tag, there is not battery to use and no need for maintenance.

RFID also penetrates most materials. Tags can easily be embedded into non-metallic items such as labels, pallets, keyfobs, cards etc. For nonmetallic or non-transparent materials such as paper, lumber and plastic, RFID may also carry on the data communication. It is however more affected by surrounding metals. The RFID tag shows poor performance around liquids and metals.

The tag with larger memory capacity can store specific manufacturing information associated with each case of products in the manufacturer’s database. The appropriate information from that database can be accessible to distributors and retailers. The content of the memory space can be expanded without difficulty.

**Issue Analysis & Project Positioning**

**Two main aspects to the project:**

A. Surgical Hemostatic Gauze

The most common malpractice in surgeries is to leave hemostatic gauze inside the body of patients, which result in operating another surgery to take it out. This malpractice might seriously affect the health of patients if it was not discovered in time. Some relevant medical reports are stated in table 2 as below.

There are some reasons as below to leave gauze inside the body:

1. Too complicate surgery process or concerning various body positions
2. Nurse shifts of surgery room
3. More than one surgery team operate one surgery
4. Disturbances during process of gauze cleaning
Table 2 Surgical malpractice cases of hemostatic gauze left inside the body of patients

<table>
<thead>
<tr>
<th>Items</th>
<th>Source</th>
<th>Dates of Events / Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ettoday News</td>
<td>8th of March 2009, Taipei County / One parturient had abdominal pain after hysterotomy, due to the diapysis caused by hemostatic gauze left inside her abdomen, which generated amyocardia.</td>
</tr>
<tr>
<td>2</td>
<td>TTV News</td>
<td>28th of July 2008, Taichung City / One patient has undergone eight-month-long abdominal pain after cholecystectomy, due to the surgical malpractice of hemostatic gauze left upon the duodenum and some small part of it went through the perforation of the gastric.</td>
</tr>
<tr>
<td>3</td>
<td>TTV News</td>
<td>4th of May 2005, Kaohsiung / One woman who regularly has abdominal pain after the deligation. After a series of examinations and surgeries, a piece of gauze was taken out.</td>
</tr>
</tbody>
</table>

5. Insufficient time to gauze cleaning, leading to inaccuracy
6. Miscommunications to surgery staff
7. A shortage of whiteboards to record the number of gauze in surgery room
8. Disposal of used medical items casually
9. Increasing amount of usage in gauze out of haemorrhage during the surgery

**Solution**

In addition to enhance the specialty of nursing staff, we are looking for more possibility to apply technology on the gauze usage checking in order to reduce the rate of error into zero.

However, it is still an unrealized technology to integrate RFID Tag and the gauze. In this technique, how to install the Tag into the gauze firmly is needed to be considered as different places of installment might just lead to different outcome. Both RFID and Reader are directive so as the RFID signal is easy to be blocked by any objects, and the most concerning issue is thus the asepsis security. Before all these problems find the way out, we still have a big step to overcome in this project.

**B. Wireless Endoscopy Technology**

The rapid development of Sensors, Micro Devices, and Wireless Communications, make it possible of Micro-Endoscopy Diagnosis System. In 2000, some experts collected the image of pork stomach by using the device of candid camera, small halogens, microwave transmission, and batteries to further prove the possibility of Wireless Endoscopy Technology 14.

The traditional push-type endoscopy is commonly used to exam through month to throat, esophagus, stomach, and duodenum, deep into one meter from pylorus at most. And the advanced Capsule Endoscopy is used as a less-invasive procedure with a miniature capsule recording images through the digestive tract. M. Appleyard and others had ever analyzed the Performance, Sensitivity, Specificity, and Safety for these two techniques to diagnose diseases and disorders of animal’s small intestine. Research has shown that Capsule Endoscopy can detect deeper and find evidence of disease in some cases that traditional
push-type endoscopy cannot. However, in the depth into one meter from pylorus to small intestine, the sensitivity of Capsule Endoscopy is lower than the other. Both of the specificity reaches 90% and more.

**b1. Positioning Control**

Recent development of Capsule Endoscopy is mainly used to diagnose hemorrhages of small intestine. In some cases of gastrointestinal hemorrhages, when the disease cannot either be diagnosed by gastro-scope and large intestine scope or be observed by angiography and nuclear medicine, Capsule Endoscopy will be the easiest way to diagnose the disease by tracking the bloodstains or clot, for its high sensitivity and less invasive procedure. As for other small intestine disease, i.e. malignant tumors of the small intestine or enteritis, Capsule Endoscopy also has the value of diagnosis reference.

However, there is some limitation in Capsule Endoscopy. When the patient swallows the pill, the capsule is unable to stay in the same place through manual control as the pill slides with enterocinesia. For stomach with larger space, Capsule Endoscopy can only visualize half part of it, but not able to visualize the same place back or forth like gastroscopy, either to do biopsy. It is somehow difficult to diagnose if there is cancer
or just some wrinkles caused by enterocinesia.

It is a big issue to design the Endoscopy for a better effectiveness without causing any pain to patients. The size, the way to control, the quality of images, and the convenience are factors to be concerned about. For all these needs, we are going to design a small but controllable Magnetic Capsule Endoscopy.

Compared to the importance of Capsule Endoscopy, it is more important for us to strengthen the knowledge in this aspect. A controllable system or the ability to enhance Capsule Endoscopy in medical treatment is much more needed.

b2. Wireless Capsule Endoscopy Image Identification

The best benefit to Capsule Endoscopy is that there is no longer a dead space in the image of small intestines, while the defect is that physicians have to check every raw image taken very carefully. Since one single endoscope image of digestive tract is commonly used by professional physicians nowadays, it seems to be a waste of resources by checking images one by one.

The aim of the research is thus to find out diseases or disorders of the gastrointestinal tract by Capsule Endoscopy images and to mark it automatically, so as to reduce time and quantity played in Capsule Endoscopy through images processor analysis; and furthermore, to find out the most applicable algorithm to assist in fastening diagnosis functions. In suspicious images analysis, it will be easier for physicians to precede digital analysis with sola endoscopy images through user’s interface. For example, using size-reduced images to locate the corresponding position and range of the symptom as well as sola diagnosis image records, and so on, are easier ways to assist physicians in observing and diagnosing the intestine conditions.

References


<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Common Application</th>
<th>Healthcare Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-frequency (9-135KHz)</td>
<td>This frequency band in most countries is open, do not involve laws and license regulations restriction.</td>
<td>Restricted communication range,(limited to 1.5m)</td>
<td>Access control.</td>
<td>Medical wristbands, access control, inventory control, wake-up active RFID tags</td>
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<td></td>
<td></td>
<td></td>
<td>Animal identification.</td>
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<td></td>
<td></td>
<td></td>
<td>Inventory management.</td>
<td></td>
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<tr>
<td>High-frequency (13.56MHz)</td>
<td>1. In the vicinity of metal, tag can’t continue its normal operation.</td>
<td>1. In the vicinity of metal, tag can’t continue its normal operation.</td>
<td>Library books.</td>
<td>Smart card, medical</td>
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<tr>
<td></td>
<td>2. Communication range about 1.5m.</td>
<td>2. Communication range about 1.5m.</td>
<td>Item tracking.</td>
<td>Smart card, medical</td>
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<td></td>
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<td></td>
<td>Smart cards.</td>
<td>Smart card, medical</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Airline baggage.</td>
<td>Smart card, medical</td>
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<td></td>
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<td></td>
<td></td>
<td>Medical wristbands, access control, inventory control, wake-up active RFID tags</td>
</tr>
<tr>
<td>Ultra-High frequency (300-1200MHz)</td>
<td>Read range over 1.5m and less susceptible to weather.</td>
<td>1. This frequency band does not allow in Japan for commercial applications</td>
<td>Factory material inventory system.</td>
<td>Real-Time Locations Services (RTLS), asset tracking, infant / patient monitoring, sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The disturbance occurs when the frequency band is too close.</td>
<td>Truck and trailer’s tracing.</td>
<td></td>
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<td></td>
<td></td>
<td>3. It will affect the system operation under the damp environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microwave (2.45 or 5.8GHz)</td>
<td>More than 1.5m to read.</td>
<td>1. This frequency band does not allow in certain European country for commercial applications.</td>
<td>Railroad car monitoring.</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>2. Complex system development flow.</td>
<td>Automated toll collection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. It is not widely used now.</td>
<td>Utility monitoring</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 RFID frequency bands and corresponding application areas
Identification of Antibiotics Resistance Strain of Helicobacter Pylori by Molecular Biology Technique and its Clinical Implication

Chi-Yang, Chang¹, Hsu-Wei Hung², Chang-Jie Yang²¹, Chen Yi-Fan², and Jaw-Town Lin²

¹ College of Medicine, I-Shou University ,
² Taipei Institute of Pathology

Abstract

Helicobacter pylori (H. pylori) infection has been shown to be associated with chronic gastritis, peptic ulcer disease, gastric cancer, and mucosa-associated lymphatic tissue lymphomas (MALT or MALToma). Eradication of H. pylori has been shown to reduce the recurrence of peptic ulcer disease and even lead to complete remission of MALToma. Triple therapy which includes one proton pump inhibitor plus two antibiotics is currently the standard therapy for H. pylori infection. Clarithromycin, amoxicillin, metronidazole, and levofloxacin (a fluoroquinolone) are among the most commonly used antibiotics in the treatment of H. pylori infection. Antibiotic resistance is the most important factor leading to eradication failure, although patient compliance and variations in drug metabolism are also important. If the use of antibiotic can be guided by susceptibility test before treatment, it is expected that the eradication rate might be higher. In this study, we aimed to use molecular methods by detection of the mutations in 23s rRNA and gyrase genes of H. pylori to predict its resistance to clarithromycin and fluoroquinolones, respectively.

Introduction

Helicobacter pylori (H. pylori), originally named as Campylobacter pyloridis, is a
gram-negative bacilli with a length and width of about 2.5-5µm and 0.5-1.0µm, respectively. It was re-classified into the Helicobacter genus and re-named as H. pylori in 1989. It is so far the only bacteria that could persistently colonize the human stomach and lead to a variety of gastroduodenal diseases. H. pylori infection is usually acquired by oral ingestion of the bacterium, rather than as the normal flora of the gastrointestinal tract. It takes about 3-7 days for H. pylori to be cultured using special culture media under microaerobic condition. H. pylori can penetrate into the mucus layer with the aid of its flagella and bind tightly to epithelial cells by adhesin. It also has urease which can hydrolyze urea into carbon dioxide and ammonia and thereby neutralize the acid in stomach. It is estimated that H. pylori infection is present in 70-80% of patients with gastric ulcer patients, 95% of patients with duodenal ulcer, 70-90% of patients with gastric cancer, and more than 90% of patients with MALToma. This underscores the importance of H. pylori infection in the pathogenesis of gastroduodenal diseases [1]. It was classified as type I carcinogen by the World Health Organization (WHO) in 1994.

Eradication of H. pylori infection is strongly recommended in peptic ulcer patients who have this infection. Triple therapy which consists of one proton pump inhibitor (PPI) plus two antibiotics is currently the standard treatment for H. pylori infection. The antibiotics that are commonly used in the treatment of H. pylori infection include amoxicillin, clarithromycin, metronidazole, and levofloxacin. C13-Urea Breath Test (C13-UBT) is the most commonly used test to assess the treatment response 4-6 weeks after eradication therapy. In average, the eradication rate after one standard treatment is about 80-90%. Antibiotic resistance is the most important factor that leads to treatment failure. A prior knowledge of the antibiotic resistance pattern before initiation of eradication might reduce the treatment failure rate [2]. Therefore, we aimed to use molecular methods by detection of the mutations in 23s rRNA and gyrase genes of H. pylori to predict its resistance to clarithromycin and fluoroquinolones, respectively.

Material and methods

About 150 strains of H. pylori were isolated between 2006 and 2008 in this study. PCR reactions were performed in a volume of 25 µL containing 10 mmol/L Tris-HCl (pH 8.3), 50 mmol/L KCl, 1.5–2.5 mmol/L MgCl2, 200 µmol/L deoxynucleoside triphosphate, 0.25 U of Hotstart Taq, and 25 pmol of both forward and reverse primers (Table 1). PCR was performed in a thermocycler under the following conditions: 10-minute preincubation at 95°C, followed by 40 cycles of 30 seconds at 95°C, 30 seconds at 60°C, and 45 seconds at 72°C. Final extension was performed for 5 minutes at 72°C. The reaction products were visualized by running 5 ul of the reaction mixture on 3% agarose gel. PCR sequencing of the amplified DNA was performed by ABI PRISM 3700 sequencer (Applied Biosystems). The sequences were compared with the published sequence of the H. pylori gyrA gene and 23s rRNA gene [3, 4].

1. Clarithromycin resistance
Clarithromycin resistance is associated with point mutations within the peptidyltransferase region encoded in domain V of the *H. pylori* bacterial 23s rRNA gene. In this study, DNA were successfully extracted in 144 samples. The PCR products are 425bp and the normal and mutant sequence chromatograms are shown in Figure 1. A total of 16 clarithromycin resistance strains were identified (11.1%, Table 2).

**Fluoroquinolones resistance**

These hotspot point mutations are mainly related to amino acid substitutions at amino acid 87 and 91. A total of 126 strains were surveyed for fluoroquinolone resistance. The PCR products

![Fig.1](image)  
**Table 1** primer sequence for *H. pylori* gyrA and 23s rRNA gene

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Primer set</th>
<th>PCR product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>gyrA</td>
<td>gyrA1F: 5'-TTRGCTTATTGAGCGT-3'</td>
<td>428 bp</td>
</tr>
<tr>
<td></td>
<td>gyrA1R: 5'-GCAGACGGTGTARAATA-3'</td>
<td></td>
</tr>
<tr>
<td>23s r RNA</td>
<td>Hp23-F: 5'-CCACAGCGATGTTCTCAG-3'</td>
<td>425 bp</td>
</tr>
<tr>
<td></td>
<td>Hp23-R: 5'-CTCCATAAGAGCCCAAGCCC-3'</td>
<td></td>
</tr>
</tbody>
</table>

1. A total of 16 clarithromycin resistance strains were identified (11.1%, Table 2).
2. Fluoroquinolones resistance

These hotspot point mutations are mainly related to amino acid substitutions at amino acid 87 and 91. A total of 126 strains were surveyed for fluoroquinolone resistance. The PCR products...
Table 2 Distribution of H. pylori Clarithromycin-resistant isolates according to sequence analysis.

<table>
<thead>
<tr>
<th></th>
<th>23s rRNA</th>
<th>2142 bp -2143 bp AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>mutant nucleotide</td>
<td>cases</td>
<td></td>
</tr>
<tr>
<td>A2142G</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A2143G</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

are 428bp and the normal and mutant sequence chromatograms are shown in Figure 2. Point mutations at position 87, 91 and 97 were found in 7 strains (5.8%), as shown in Table 3. More than half of fluoroquinolone resistance (4/7) occurred at position 87.

H. pylori is a Gram-negative, microaerophilic bacterium that inhabits in the stomach. Over 50% of individuals infected with the bacterium worldwide. European and U.S. guidelines recommend the use of triple therapies (proton-pump inhibitor, clarithromycin plus amoxicillin, or metronidazole) for 7 to 14 days to cure this infection. Since molecular biology is developed quickly, novel culture-free polymerase chain reaction (PCR)–based assays have allowed the detection of the genetic mutations that are involved in the mechanisms of drug resistance [3].

The antibacterial activity of clarithromycin has been attributed to the inhibition of protein synthesis after binding to the 50S ribosomal subunit of the microorganism. Clarithromycin resistance is associated with point mutations within the peptidyltransferase region encoded in domain V of the H. pylori bacterial 23s rRNA gene. The 2 most common mutations associated with clarithromycin resistance are A to G transitions at positions 2142 and 2143 of the 23s rRNA gene [5].

However, H. pylori resistance against clarithromycin is increasing worldwide, reducing the eradication rate to 70 to 85%. In this study, the overall resistance rate to clarithromycin was about 11.1% (16/144, Table 2), similar to the previous report in eastern Taiwan (13.5%) [6] and Japan (12.9%) [7], but higher than that reported in Korea (5.9%) [8]. No other type of mutant in addition to the A2143G mutation was found in this study.

A recent study in Taiwan showed that a high eradication rate using levofloxacin-based therapy as a second-line treatment for patients who failed from first line clarithromycin-based triple thera-
Fluoroquinolones exerts its inhibition action by binding to the DNA gyrase and interferes with bacterial DNA replication. The gyrase enzyme is a tetramer consisting of two A and two B subunits encoded by the gyrA and gyrB genes. This enzyme is able to relaxing supercoiled DNA. The enzyme is in involved in DNA replication, recombination and transcription. The gyrA gene of *H. pylori* was cloned and sequenced. An open reading frame of 2,478 nucleotides coded for a polypeptide of 826 amino acids with a calculated molecular mass of 92,508 Da [9].

The mechanism of resistance to fluoroquinolones in *H. pylori* has been shown to be linked to mutations in the so-called quinolone resistance-determining region (QRDR) of the gyrA gene. These hotspot point mutations, mainly involving amino acid substitutions at amino acid 87 and 91. Mutation in gyrB is also reported in levofloxacin-resistant strains, but it often occurred together with gyrA mutations.

The prevalence of fluoroquinolones resistance in *H. pylori* is different according to the geographic areas. The *H. pylori* resistance rate for levofloxacin in Taiwan 2004-2007 was 11.8% [10], almost the same as that in Hong Kong [11], and was lower than that in Japan (15%) [12] and Korea (21.5%) [13]. Recent surveys suggest that resistance to fluoroquinolones might have increased over the past few years in several

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Fig. 2 (a) gyrA gene amplified fragments were visualized on a 3% agarous gel electrophoresis stained with ethidium bromide. (b) Sequence chromatograms displaying the types of mutation found in this study at position 87 Asn>Lys
countries: from 3.3% in 1999 to 7.5% in 2003 in France, and from 0% in 1987 to 21% in 2003 in Korea. The previous study of K.H. Hung et.al. (2009) also demonstrated that the resistance to either ciprofloxacin or levofloxacin was increased from 2.8% (1998-2003) to 11.8% (2004-2007) in southern Taiwan. In this study, 7the resistance rate to fluoroquinolones was 5.8%, which was lower than that reported by Hung et.al. [10].

The continuous surveillance of fluoroquinolones resistance among *H. pylori* is important in Taiwan. The major part of fluoroquinolones resistance was due to point mutations of the gyrA gene at the amino acids 87, 91. The most point N87 mutations have been reported are N87H, N87I, N87K and N87Y, the ratio is 6/17 in Hong Kong (C.C. lee et.al.) and 4/12 in southern Taiwan (K.H. Hung et.al.). Moreover, the most common mutation points are D91G, D91N and D91Y, with a ratio of 10/17 [11] in Hong Kong report and 8/12 [10] in southern Taiwan. However, the most common mutation type is N87 (4/7) in this study, which is different from previous study of Lee et.al. and K.H. Hung et.al. .

In this study, the results showed a high eradication rate of fluoroquinolone-based triple therapy for those who failed from clarithromycin-based triple therapy. However, caution should be taken that the eradication rate might vary in different geographic areas where the clarithromycin and fluoroquinolones resistant rates are different. In order to establish a fast and accurate molecular diagnostic platform for the clinical of *H. pylori* infection, increases sample size and minimal inhibitory concentrations (MIC) test will be included in further study.

### References

1. 林肇堂，胃腸疾病與幽門螺旋桿菌，健康世界叢書22，健康世界雜誌社。


Due to the requirement of the society and the development of economy, the need of motorcycles from the general public has been increasing. According to the statistics, the total number of the motorcycles in our country was eight hundred and twenty thousand, and then as now 2001, the number has increased to eleven million seven hundred and seventy thousand. As you can imagine, the reason why it has increased 14.3 times in thirty years is because motorcycles have the pros that first they are smaller and easy to get everywhere. Since they are smaller than cars, that also makes it easier to park, which is one of the reasons why the number of people who would rather choose to have scooters has been going up, not down. With gas price skyrocketing, motorcycles has become the first choice among the general public as the mode of transportation, and also become the essential daily needs of people. As a result, the design of motorcycles should also focus on the safety issue and comfort for the riders. However, the safety of the passenger is usually neglected.

The safety issue about the rider as mentioned above illustrated in Fig.1 When a rider who sits behind the driver on the motorcycle, since the handle bar is usually set on the back of the motorcycle, which is quite uncomfortable and inconvenient. As a result, the rider who sits in the back of the motorcycles would usually embrace the drive to make sure the safety when riding. However, as the motorcycle is moving forward, it would accelerate or brake rapidly, if the rider who sits behind the drive stays on the motorcycle for a long time, it would normally make the rider lose his/her balance no matter he/she holds the...
handle behind the back or embrace the driver in front. So far we get to know that the handle bars in the back of the motorcycles are mostly designed to help move the motorcycles, not designed to make it convenient for the riders to hold it. Besides, such design does not fit ergonomics which would no doubt decrease the safety level for the riders. Therefore, it comes to the point that how to invent a handle grip for the riders to enhance their stability on motorcycles has become the goal of this research.

The present invention provides a handheld structure for passengers to hold on while riding a motorcycle in Fig.2. The motorcycle has a frame body and a seat is set thereon. And the handheld structure includes an outer rod segment and an inner rod segment. The outer rod segment is fixedly set on one side of the seat or the frame body. In addition, the outer rod segment is of a hollow configuration and a hole is disposed in the side walls of the outer rod segment. Moreover, a grip portion is extended from the inner rod segment. Besides, an engaging member is disposed in a side of the inner rod segment, and the position of the engaging member is corresponding to that of the hole in the outer rod segment. The inner rod segment is disposed in the outer rod segment and can be extended or retracted so as to perform a relative movement with the seat or the frame body. When the engaging member is engaged with or released from the hole, the inner rod segment can be securely extended or retracted and accommodated in the outer rod segment. Therefore, the passenger in the back seat of the motorcycle can hold the handheld structure while riding motorcycle to keep stable.

As the life standard steeping into a better quality, the number of vehicles has increased which would sure crowd the roads and streets.
With limited land, the number of the vehicles, however, keeps adding up more and more, that makes it harder for cars to keep a safe distance between each other. For most of the drivers, usually they tailgate the car in front of them when they drive, but such kind of driving behavior causes traffic accident as much as 15 to 20 percent by bumping into the back of the car in front. Drives usually get the information from the surroundings by her / his sight. When driving, drivers have to pay full attention to the brake light from the car in front and the mirrors of the right and left. Drivers regularly brake when they see the brake light from the car in front of them, so how to inform the drivers to brake before the brake light goes on from the car in front is essential.

If something happens on the road in front, drivers have to be able to brake rapidly. However, in the normal situation when driving, we could not really forsee what is about to happen, the brake light from the car in front is the only information the drivers can get, so the drivers all depend on the brake light to decide whether to brake or not. Nowadays, vehicles are getting more, it is harder to keep a safe distance between each other. So far, some vehicles have put on the third brake light, along with the side brake lights (some vehicles even install rapid break alarm). We know that the function of braking alarm is activated by the action of the brake pedal. The process is mainly analyzed by the determination of whether the drivers step on the brake pedal or not, and the action of the third brake light; if the break pedal isn’t stepped down, then the break light or the third break light would go off.

But all these devices mentioned above would only let out signal under the situation when the drivers step down the break pedal. If we want to decrease the number of traffic accidents, it is surely necessary to enhance the awareness of the drivers before the brake light go on from the car in front.

On the other hand, since there are only directional light, braking light and reversing light showing the signal of the vehicle. Nothing else could show the situation of the acceleration of the vehicles. Also, as the road is limited, generally when vehicles are on the road, drivers need to tailgate other cars. Therefore, when the car in front stops accelerating (foot is not off the accelerator pedal yet) and meanwhile no change on the braking pedal, the speed of the car is going down, during this period, the drivers behind can not get any signal and could only adjudge by the sense of sight. However, generally speaking, when two cars are moving forward at a high speed, it is difficult to gauge the speed of the car in front by sight from the second driver. So, the second driver would usually keep accelerating until the distance between the two cars has obviously decreased, and then the driver would be aware of it and brake suddenly. And then the first driver accelerates again, but now the second driver has already slowed down. In order to catch up, the second driver push the accelerate and try to speed up. This kind of grey-zone-period is the cause of traffic accidents, which is also an invisible energy killer. It wastes lots of gas when drivers slow down and then rapidly accelerate to speed up.
again. Such behavior exists in most of the drivers. As a result, we could estimate that a huge amount of energy has been wasted every day. According to the research, about ten percent of the energy has been wasted by such kind of driving behavior, since the drivers have no idea about what the situation is from the vehicles in front.

Consequently, how to inform the drivers to enhance their awareness of the safety issue before the brake light goes on by the most reliable, the simplest, and the most direct approaches based on the situation of the vehicles to predict the speed slowing down and motivate the driver to carry out the action of braking has become an important lesson of saving energy and developing the higher level of safety in driving.

A braking prewarning system is provided (Fig. 3). The braking prewarning system can predict a timing of a vehicle is going to reduce speed or brake and then issue an alarm signal to other vehicle drivers on the road. The system includes a sensor for sensing accelerator pedal position and an alarm device, and cooperates with an accelerator pedal of vehicle. In addition, the sensor is an electrical circuit with a switch and can form a closed circuit loop when the accelerator pedal is in a released position. The alarm device is connected to the electric circuit of the sensor and be activated when the electric circuit of the sensor is in a closed loop.

Fig. 3 A braking prewarning system
Abstract

Acute esophageal variceal hemorrhage is a dreadful complication of portal hypertension. Its management evolved rapidly in recent years. Vasoconstrictor such as somatostatin or terlipressin proven to be able to control approximately 80% of bleeding episodes, are generally used as a first line therapy. Following the use of vasoconstrictor, endoscopic therapy is often employed to arrest the bleeding varices as well as preventing early rebleeding. Meta-analysis showed that the combination of vasoconstrictor and endoscopic therapy is superior to endoscopic therapy alone in the control of acute esophageal variceal hemorrhage. We performed studies to evaluate the role of endoscopy in the management of acute esophageal variceal hemorrhage. Our studies showed that endoscopic variceal ligation (EVL) is superior to endoscopic injection sclerotherapy (EIS) and vasoconstrictor in the control of acute esophageal variceal hemorrhage.

Introduction

Acute esophageal variceal hemorrhage (AEVH) is a devastating complication of portal hypertension. Observation of the natural history showed that AEVH might be associated with a mortality of 40%, and a high incidence of early rebleeding, i.e. in the order of 30% to 50% in the survivors (1-3). The factors responsible for AEVH are not well delineated. Elevated hepatic venous pressure gradient (HVPG) > 12 mmHg is a prerequisite for variceal rupture. Poor hepatic reserve and the appearance of a lot of red color signs on the large varices also are important factors predictive of AEVH (1-4).

On presentation of patients suspected to bleed from ruptured esophageal varices, first aid should include proper blood transfusion, naso-
gastric irrigation, administration of lactulose and prophylactic antibiotics. Moreover, vasoconstrictors should be administered as soon as possible (5). Vasoconstrictors are usually safe and easy to apply for patients with AEVH. The use of vasoconstrictors has been demonstrated to reduce the incidence of active variceal bleeding during endoscopy and make endoscopic therapy easier to perform, even prolonged life (6-7). A meta-analysis of publications dealing with endoscopic therapy of AEVH revealed that combination of endoscopic therapy and vasoconstrictors is superior to endoscopic therapy alone in the cessation of acute bleeding as well as preventing early rebleeding (8). The 5-day hemostatic rate was 58% in patients receiving endoscopic therapy alone, while the corresponding figure was 77% in patients receiving combination therapy. Thus, combination of endoscopic therapy and vasoconstrictors becomes the cornerstone in the management of AEVH. We have performed a series of study to evaluate the role of endoscopic therapy in the management of AEVH.

Materials and methods

Cirrhotic patients presenting with either hematemesis or melena and endoscopically proven acute esophageal variceal bleeding were considered to be enrolled. Acute esophageal variceal bleeding was defined as when active bleeding was noted to be issued from an esophageal varix or when red color signs on the esophageal varices with blood in esophagus or stomach and no other potential site of bleeding identified. Patients associated with hepatocellular carcinoma or other malignancy, cerebral vascular accident, uremia, sepsis, bed-ridden or other serious debilitating diseases were excluded.

Patients with active variceal bleeding during endoscopy were enrolled to receive either EVL or EIS in the first study (9). The second study compared EVL and somatostatin in the control of AEVH (10). The third study evaluated the combination of EVL and terlipressin 2 days versus terlipressin alone for 5 days, in the prevention of early rebleeding in patients with inactive bleeding at endoscopy (11).

Results

In the first study, a total of 254 patients of AEVH were encountered, and 89 cases (35%) were noted to be actively bleeding during endoscopy. Finally, 71 eligible patients with active variceal bleeding during endoscopy were enrolled, 37 patients in EVL group and 34 patients in EIS group. Hemostasis was achieved in 36 patients (97%) of EVL group(Fig.1A&1B) and 26 patients (76%) of EIS group (p=0.009). Rebleeding within one month was noted in 17% of the EVL group and 33% in the EIS group. Significant complications occurred in 5% of the EVL group and 29% of the EIS group (p=0.007). Mortality within one month was 19% in the EVL group and 35% in the EIS group (p=0.19). (Fig.2)

In the second study, 296 patients were screened for eligibility, finally 125 patients were enrolled. 62 patients were treated with emergency EVL and 63 patients received somatostatin infusion at a dose of 6mg/24 hours. Both groups were comparable at baseline data. Of the 62 patients in EVL group, 2 patients (4.8%) experienced
verse events were similar between the two treatment groups. (Fig.3)

In the third study, a total of 201 patients with AEVH including 15 patients with active bleeding at endoscopy were encountered. After excluding patients meeting exclusion criteria, 93 patients were enrolled in the trial, 47 patients in Terlipres-sin group and 46 patients in Combination group.

In patients with active bleeding at endoscopy, treatment failure was 12% in the EVL group and 69% in the somatostatin group (p=0.002); in patients with inactive bleeding at endoscopy, treatment failure was 2.2% and 22%, respectively (p= 0.004). The incidences of adverse events were similar between the two treatment groups. (Fig.3)

Fig.1A Endoscopic appearance of acute esophageal variceal bleeding.

Fig.1B Variceal bleeding was stopped by ligation.

Fig.3
Failure to control acute bleeding was encountered in 4 patients (9%) in Terlipressin group and 1 patient (2%) in Combined group (p=0.20). Very early rebleeding occurred in 7 patients in Terlipressin group but no patients in Combined group (p=0.006). Thus, treatment failure at 5 days was 24% in Terlipressin group and 2% in Combined group (p=0.002). Complications were similar between both treatment groups (Fig.4).

**Discussion**

AEVH is a serious complication of portal hypertension. The mortality associated with AEVH may reach one third within 6 weeks. With the advancement of treatment, the mortality was decreased to 20%. This could be ascribed to use of prophylactic antibiotics, use of vasoconstrictors and endoscopic method evolved from EIS to EVL.

During endoscopic examination, active variceal bleeding is believed to account for one third of AEVH (2-4). The presence of active variceal bleeding with exanguination of fresh blood is a great challenge for endoscopists. The optimal method to treat these lesions is disputed (12). Our first study showed that EVL is superior to EIS in the arresting of active variceal bleeding (9). Owing to decrease of one third visual field, there is technical difficulty to perform EVL under such a circumstance. However, our study revealed that endoscopists skilled in the procedure of EVL could achieve satisfactory results even during massive variceal bleeding. Villanueva from Spain also demonstrated that combination of somatostatin with EVL is superior to combination of somatostatin with EIS in the control of AEVH, consistent with our results (13). On rare occasions, EIS could replace EVL as a feasible tool in the arrest-
Prior to the introduction of EVL in the management of variceal bleeding, a number of studies have compared vasoconstrictors with EIS in the control of AEVH (14-15). Most studies demonstrated that vasoconstrictors are as effective as EIS in hemostasis of AEVH and associated with fewer complications. A meta-analysis also showed that available evidence does not support EIS as the first-line treatment of AEVH when compared with vasoactive drugs, which control bleeding in 83% of patients. EIS is suggested to be added only in pharmacologic treat-
ment failures (16). That’s why we perform our second study to compare EVL with somatostatin in the management of variceal bleeding. Our study disclosed that EVL is definitely superior to somatostatin in the overall control of bleeding, irrespective of active bleeding or inactive bleeding. The complications of EVL, unlike EIS, were similar to somatostatin. This study clearly showed that EVL rather than vasoconstrictor is the treatment of choice for AEVH.

In view of the efficacy of vasoconstrictors such as terlipressin or somatostatin in the cessation of AEVH was around 80%, the use of vasoconstrictors alone in those who have stopped bleed during endoscopy has been favored by western scholars (17). Our third study compared terlipressin infusion alone for 5 days versus EVL plus terlipressin infusion for 2 days for patients with inactive variceal bleeding at endoscopy. The results showed that EVL plus terlipressin infusion could achieve 98% hemostatic rate without very early rebleeding. By contrast, terlipressin infusion alone up to 5 days could reach only 91% hemostatic rate and very early rebleeding (within 5 days) may up to 15%. Our data clearly suggested that combination of EVL and vasoconstrictor for 2 days is preferable to vasoconstrictor for 5 days in the hemostasis and in the prevention of very early rebleeding in patients with inactive variceal bleeding at endoscopy.

In summary, our serial study suggested that EVL should replace EIS as the endoscopic treatment of choice for patients with AEVH. The use of vasoconstrictor has proven to be effective in the hemostasis of AEVH. However, based on our data, EVL instead of vasoconstrictor should take a leading role in the control of AEVH as well as in the prevention of very early rebleeding. Undeniably, combination of EVL and vasoconstrictor rather than EVL alone may be the best option in patients with AEVH. During combination therapy, use of vasoconstrictor such as terlipressin or somatostatin for only 2 days may be sufficient to prevent very early rebleeding.

**References**


• Non-Experimental Methods in Health Research-Design and Analysis: Case Control Studies

Speaker: Professor Erika Friedmann
Date: July 21, 2009
Place: Room A0701-1, Department of Nursing, I-Shou University
**OPPORTUNITIES**

Opportunities from NSC

- **2009 NSC-AAFC Postdoctoral Internship Program**

  The collaboration between AAFC and the National Science Council (NSC) of Taipei is reaching a new milestone with the launch of the NSC-AAFC Postdoctoral Internship Program. Information is available in both Chinese and English at the NSC web site. Under this program, NSC willing award up to 10 scholarships each year. These scholarships will cover travel and living expenses while AAFC will provide the facilities, training and research costs in Canada.

  The NSC is responsible for S&T development and manages funding for academic research and international science programs. The first discussions between AAFC and NSC began in Taiwan April, 2008. On September 16, 2008 a delegation lead by Deputy Minister Lih Chen met with Marc Fortin in Ottawa to discuss further collaboration, training opportunities and mechanisms between the two organizations. The Canadian Trade Office in Taipei signed a MOU with the Taipei Economic and Cultural Office in November, 2008. This MOU sets the framework for Taiwanese graduate students and scientists to receive agriculture training at AAFC. A similar MOU is ongoing with the National Research Council of Canada for over 10 years which allow Taiwanese students and scientists to come to their laboratories. Taiwan is Canada’s 10th most important market for agriculture and food products, and the fifth agri-food market for Canada in Asia.


  Deadline for proposal: July 31, 2009

- **2009 NSC-NRC Ph.D and Postdoctoral Internship Program**

  Cooperative MOU have been signed between the NSC, Taipei and the NRC, the NSERC, and the SSHRC, Ottawa. Among these, cooperation between the NSC and the NRC remains most active. NSC-NRC cooperation puts special emphasis on Cooperation Research Projects (CRP). Through the arrangement of symposia and exchange visits, scientists of both sides are helped to find suitable counterparts to formulate CRP proposals. Approved CRPs are announced at the annual bilateral steering committee meeting. There were six CRPs granted in 1999 and eight CRP proposals, which are currently under evaluation. The approved CRPs will be granted bilaterally this year. Major cooperative fields include biochemistry, aerospace, cancer therapeutics, silicon technology and nanoelectronics, etc. There are eight symposium proposals being planned for the year 2000, which will cover topics from the major cooperative fields. Symposium coordinators from both sides have been appointed and their plans and budgets will be submitted. The NSC cooperates with the NSERC of Canada through its National Earthquake Engineering Research
CRPs between the two specialize in civil engineering and structure. There are four CRPs slated for 2000, including: seismic evaluation, fire prevention technology, and life cycle management of reinforced concrete structures.

Deadline for proposal: July 31, 2009

• **Deutscher Akademischer Austauschdienst (DAAD)**

  Since 1988, the NSC has signed three cooperative agreements with DFG and the DAAD. The agreements provide a framework for the exchange of scientists and information to take place. The exchange programs, as well as joint research projects, are valuable to scientific communities on both sides. Currently there are four joint research projects co-sponsored by the NSC and DFG.

  Deadline for proposal: July 31, 2009

• **Graduate Students Study Abroad Program**

  The Graduate Students Study Abroad Program, sponsored by the National Science Council (NSC) of the R.O.C. (Taiwan), is intended to subsidize Taiwanese Ph.D. students to conduct research at an accredited educational institute abroad for a maximum of one year. The goal of this program is to encourage participants to gain international experience, to expand their research training and pave a way for future international collaborations.

  Deadline for proposal: July 31, 2009

• **Postdoctoral Research Abroad Program**

  The Postdoctoral Research Abroad Program, sponsored by the National Science Council (NSC) of Taiwan, the Republic of China (R.O.C.), is intended to subsidize Taiwanese postdoctoral researchers to conduct research at an accredited educational institute abroad for two years. The goal of this program is to encourage qualified individuals to gain research experience overseas, develop their global perspective and strengthen international collaborations.

  Deadline for proposal: July 31, 2009

• **India - Taiwan Cooperation in Science & Technology Programme**

  Pursuant to the signing of an Memorandum of Understanding(MoU) between the Taipei Economic and Cultural Centre(TECC) in New Delhi and the India - Taipei
Association (ITA) in Taipei on Scientific & Technological cooperation in Taipei on 18th April 2007, and in line with the decisions taken at the 2nd meeting of India - Taiwan Joint Committee on Cooperation in Science & Technology held in New Delhi on the 19th of February, 2009, the Department of Science & Technology (DST) and the National Science Council of Taiwan, as nodal agencies to implement the programme of cooperation in India and Taiwan on the respective sides, invites joint research proposals for implementation during the next three year period (2010 - 2012).

For more information, please visit: http://www.gita.org.in/initiatives.htm
Deadline for proposal: August 31, 2009

- Cooperative Post-doctoral Research Visit Program of National Science Council, R.O.C. and Designated Collaborative Academic Institutes in the United States

For more information, please visit: http://web1.nsc.gov.tw/mp.aspx?mp=7
Deadline for proposal: anytime