Informationization Management on Long-term Storage and Tissue Specimen Bank of Gastrointestinal Tumor Tissue Specimen

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Abstract: With the gradual increase of specimen in specimen bank, accordingly, information collection on plenty of clinical patients is also very important, as the bridge between basic research and clinical application, ecology specimen bank needs to integrate test data with clinical information to further realize personalized precise medical treatment.

1. Introduction

With the gradual increase of specimen in specimen bank, accordingly, clinical information collection on plenty of clinical patients is also very important, as the bridge between basic research and clinical application of medical treatment, ecology specimen bank needs to integrate test data with clinical information to further realize the overall personalized and precise medical treatment.

2. Long-term storage of gastrointestinal tumor tissue specimen

Gastrointestinal tumor tissue specimen management firstly needs to guarantee safety of ecology and standard operation, realize corresponding and stable personal management, guarantee quality of storage specimen The paper aims at putting forward one relatively standard sampling method and procedure management norm, providing reference for constructing one research platform of using gastrointestinal cancer specimen as base.

2.1 Sampling method

When tissue specimen is separated, firstly it evaluates sampling condition, if there is little tumor body can meet diagnosis of clinical pathology, it cannot strongly separated from isolated tissue. When it meets sampling condition, it should immediately eliminate momentum, fat etc. without preserving tissue, use sterile saline for many times to remove grump and blood on the sample. Units have conditions should sample shooting to as to keep overall appearance information. In order to prevent cross contamination, storage uses appliances after sterilization. Follow the sampling tissue of first adjacent cancer and then cancer foci, the sampling size should be 0.5cm×0.5cm×0.5cm. Tissue of adjacent cancer means the normal tissue between surgical margin and tumor; normally it can use vertical and parallel 2 kind's methods to make sampling. Vertical sampling means cutting sample along tumor margin towards operation margin, its merit can evaluate relations between tumor margin and incisal margin to confirm tumor infiltrates incisal edge or not. Parallel sampling means sampling parallels to tumor margin, which is the ideal method to obtain transaction of sample or cylinder construction. Parallel sampling is more applicable to adjacent cancer tissue far away from tumor or it is used as incisal margin of small lumen or cylinder.

2.2 Other influence factors

Compared with normal tissue, RNA density of colon cancer tissue is relatively higher, degradation and half-life period relatively lengthens. Tumor tissue meanwhile has RNA conjugated protein of

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higher level, such as HuR etc., which has been demonstrated it can stabilize RNA structure. In addition, tumor tissue most appears higher cell activity, many gens are in the transcriptional state, so the newborn RNA is relatively rich than normal tissue, RIN is obviously higher than normal value. Sample RNA of colorectal tissue has relatively low RIN, may be isolated body breeding of anaerobic bacteria accelerates RNA degradation, but the above-mentioned situation needs further research to demonstrate its causes. In addition, neoadjuvant radiotherapy and chemotherapy before surgery can cause large-scaled necrosis and fibrosis of tumor tissue, which causes sampling, has much lower RIN value.

2.3 Quality Control

When it establishes specimen and used as long-term storing tissue specimen, it needs to set a set of restrict management rules to make quality control on the inclusion sample. The heterogenicity of tumor sample will certainly appear less tumor sample included in the sample, long-term storage will unavoidably causing information degradation and loss of some biology. Test content includes DNA pureness, RNA integrity degree, phosphoric acid level of protein and tumor characteristics etc. (table 1).

Table 1 Test content

Index	method
DNA	ultraviolet spectrophotometer, absorbance A260/A280 ratio is specified DNA pureness
RNA	Agilent2100Bioanalyzer integrity value(RIN)
Protein	phosphorylation level, protein absolute level after decoration
tumor characteristics	Hematoxylin and eosin staining determines percentage of tumor cells, 80% of most tumor has good quality, if it is less than 65%, it is unqualified sample.

3. Advantages and innovation points of this specimen

According to the collected sample data, it gets the following result through statistics and analysis: there are 77 male patients, which account for 61.6%, and there are 48 female patients, which accounts for 38.4%, male is obviously higher than female, among patients of colorectal cancer and colorectal polyps, by comparing with every group patients sex percentage, the statistics data finds that female patients among 3 groups are higher than that of male, which is indicated by figure 1. Age distribution of stomach cancer is indicated by figure 2, it can be seen that age of stomach cancer are mostly aged between 51 and 60, age distribution of colon cancer is indicated by figure 3, it can be seen that age of colon cancer is mostly between 61 and 70. The above results have statistics meanings.

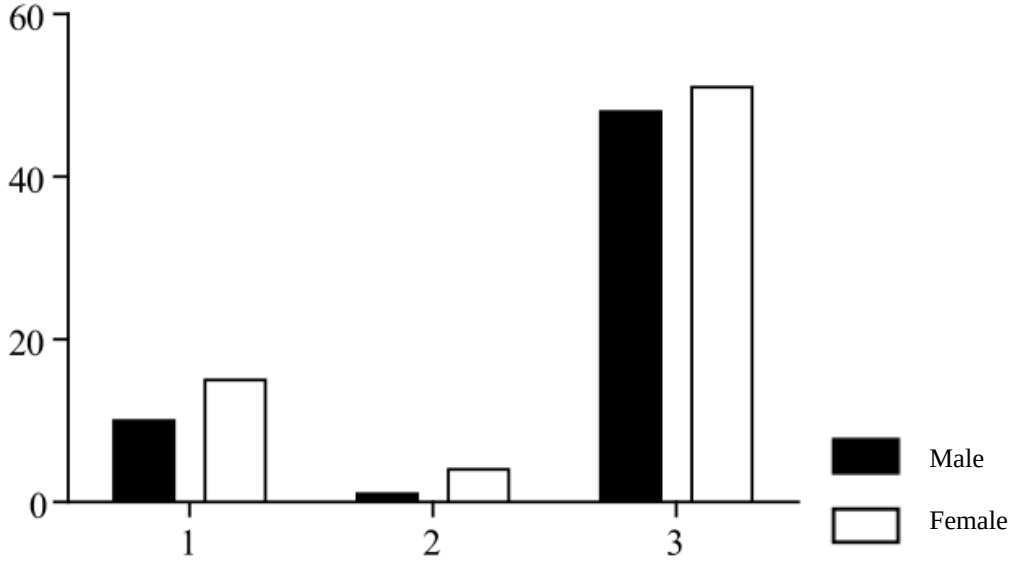

Figure 1 Patient sex distribution of colon cancer and polyp

1. colorectal polyp 2. early colorectal cancer 3. Advanced colorectal cancer

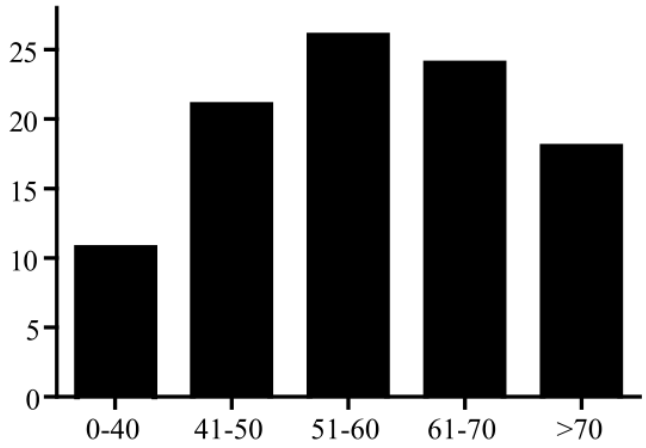

Figure 2 Age distribution of stomach cancer

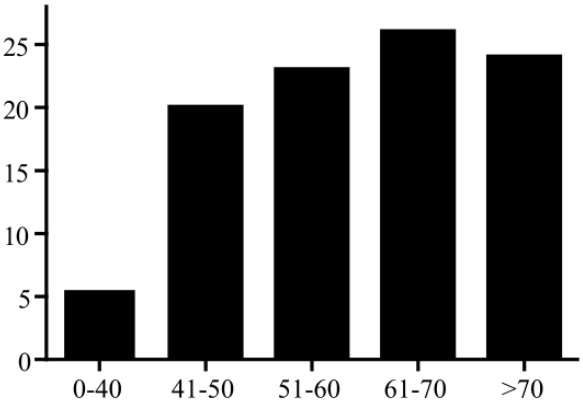

Figure 3 Age distribution of colorectal cancer patients

4. Informationization management of specimen

4.1 Component system management software and carrier of specimen resources

The software mainly involves with stocking and delivery, bar code recognition, search, statistics etc. of specimen, it should match with refrigerator, allocated storage container, bar code recognition, it should have information system interface of matching hospital, and guarantee data safety. It adopts hardware such as server, work station etc to use as software carrier.

4.2 Mainly body hardware of specimen resource component system

Refrigerator is the main body hardware of specimen resources bank, at present, the most popular is refrigerator of temperature below 80℃, and it can basically realize long-term storage of specimen. If it wants to store specimen for long time (for example, above 10 years), it is suggested using refrigerator below than 130℃, even liquid hydrogen refrigerator.

4.3 Storage container of specimen component system

Storage container includes storage tube, storage box or pipe frame, as well as allocated basket partition.

4.4 Mark system of specimen resources component system

At present, bar code recognition of specimen has several kinds, such as one-dimension code recognition, 2-dimension code recognition and wireless radio frequency recognition mark. RFID mark can realize recognition with high efficiency and quick speed; it can realize positioning function at the same time by combining with 2-dimension code. The informationization management of

specimen is the process of precisely recording and organizing correlated information such as basic information, visit information, pathological information, treatment information and storage information etc. of specimen. This system has compatibility of other clinical information system such as hospital information system linkage, picture filing and communication system, as well as data sharing and analysis.

4.5 Construction of information platform initial module

Construction of this information platform initial module adopts literature overview, expert consultation(personnel structure is indicated by table 1), site survey etc, which constructs 4 I-grade module, 20 II-grade module and 11 III-grade module, which is indicated by table 2.

Table 2 Personnel structure of expert consultation

group member	personnel number	title	working period
principal leader of hospital informationization	1	professor/ chief physician	15 years
administrator of nursing	1	Associate professor/ chief physician	15 years
information engineer	1	Secondary engineer	13 years
group director of nursing informationization	2	Principal nursing	10 years

Table 3 Tumor patients of primarily constructed and function module of continual nursing information platform

primary function module	secondary function module	Three-grade function module
Doctor center(4)	basic data	
	My wallet ((2)	my balance
	online department	Bill details
	Consultation	department setting
individual homepage (2)	advanced consultation	Paid consultation
	article	
My visit	dossier	
	Visit topic	
	Individual center ((5)	my bill
		consultation service
		amend password
		Group information
		Course catalogue
	my information	
	Right management ((2)	my team
		my alliance
	data analysis	
	interaction platform	
	patient personal center	
	healthy world	
	information center	
my message (4)	all message	
	news information	
	reservation message	
	system notice	

Table 4 Function module final confirmation of continual nursing information platform

primary function module	secondary function module	Three-level function module
doctor center	To-do of doctor	
	basic data	
	amend password	
	ccorrection by mobile	
	High-risk group	
	consultation and reservation management	picture and word management
		phone consultation management
		treatment reservation management
		video consultation and reservation management
	my wallet	my balance
		bill details
		my accumulation points
		my recommended doctor
individual homepage	my article	issue new article
	online department	article list
	disease knowledge	department set
	Consultation	paid consultation
	consultation reservation	
	article	
	user evaluation	
	soul station	
	dossier	
	Topic	
my visit	Message	individual message
		team message
		diary management
		re-check remind
	Right management	my team
		my alliance
	Data analysis	
	Individual center	my bill
		consultation service
		amend password
		group information
		Course catalogue
my message	all message	
	news and message	
	advanced message	
	system notice	
	notice	
	excellent visit message	

With the deepening of disease research, high-throughput sequencing and microarray technology cost quickly decreases, clinical test room accumulates plenty of research data, including statistics data of patient population, organizing pathology data, picturing data, gene group data etc, disease occurrence and development involves rich multi-level data, so that it forms big data of biology

informatics.

5. Conclusions

Tumor specimen of high quality is the precondition of implementing gastrointestinal tumors research, it adopts uniform and standard sampling method and quality control of fixed time can guarantee validity and stability of storage specimen, so that it can save work time and accelerate research progress. Sampling method of establishing standard gastrointestinal tumors can not only completely protect and reasonably use gastrointestinal tumors specimen resources, it can more provide guarantee for clinical and biological research of gastrointestinal tumors, which has very important transforming medicine significance.

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