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Drug therapy and monitoring for inflammatory bowel disease: a multinational questionnaire investigation in Asia

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Background/Aims: The incidence and prevalence of inflammatory bowel disease (IBD) is rising in Asia recently. The study aimed to obtain a comprehensive understanding of the current status of drug therapy and monitoring for IBD in Asia. **Methods:** A questionnaire investigation on drug therapy and monitoring for IBD was conducted right before the 6th Annual Meeting of Asian Organization for Crohn's & Colitis. Questionnaires were provided to Asian physicians to fill out via emails between March and May 2018. **Results:** In total, responses of 166 physicians from 129 medical centers were included for analysis. Among the surveyed regions, the most average number of IBD specialist gastroenterologists and nurses was 4.8 per center in Taiwan and 2.5 per center in Mainland China, respectively. 5-Aminosalicylic acid/sulfasalazine (99.4%) was the most preferred first-line choice for mild-moderate ulcerative colitis (UC), meanwhile corticosteroid (83.7%) was widely applied for severe UC. The first-line medication for Crohn's disease (CD) markedly varied as corticosteroid (68.1%) was the most favored in Mainland China, Japan, and South Korea, followed by infliximab (52.4%) and azathioprine (47.0%). Step-up strategy was preferred in mild-moderate UC (96.4%), while 51.8% of the physicians selected top-down treatment for CD. Only 25.9% and 17.5% of the physicians could test blood concentration of infliximab and antibody to infliximab in their hospitals, respectively. **Conclusions:** The current status of drug therapy and monitoring for IBD in Asia possesses commonalities as well as differences. Asian recommendations, IBD specialist teams and practice of therapeutic drug monitoring are required to improve IBD management in Asia. **(Intest Res 2022;20:213-223)**

Key Words: Inflammatory bowel disease; Questionnaire; Asia; Drug therapy and monitoring

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INTRODUCTION

Inflammatory bowel disease (IBD) has become a global concern in the 21st century, with a fast-growing incidence and prevalence in newly industrialized countries.[1] The epidemiology of IBD in Asia mirrors the Western situation that occurred over 50 years ago, due to the Westernized lifestyle, improved hygiene, growing antibiotics application and intestinal microbiota shifts.[2,3] Therefore, Asian physicians have drawn on Western experiences to diagnose and treat IBD patients by us-

ing consensuses formulated by Western IBD organizations.

With the rising IBD population in Asia, it is essential to customize Asia's own clinical guidelines. In 2006, 2010, and 2016, Asia-Pacific IBD consensuses were put forward in succession.[4-6] However, differences, such as health care systems, medical concepts, quantity of IBD specialists, management technologies and available medications, do exist among Asian countries.

In the present study, we performed a multinational questionnaire-based investigation among physicians in Asia right before the 6th Annual Meeting of Asian Organization for Crohn's & Colitis (AOCC) in Shanghai, intending to obtain a better understanding of the current status of drug therapy and monitoring for IBD.

METHODS

A questionnaire-based survey, named drug therapy and monitoring for IBD in Asia: current status, was conducted by the Chinese Society of Inflammatory Bowel Disease between March 2018 and May 2018, right before the 6th Annual Meeting of AOCC. The self-administered questionnaires were sent to and received from physicians specializing in IBD in Asian countries, including AOCC members and those who had registered to AOCC 2018, via electronic mails. The questionnaire (Supplementary Material) was composed of 69 questions, including the following 4 parts: IBD-related medical information of respondents and their units (9 items), drug therapy for induction of remission (29 items), drug therapy for maintenance of remission (18 items), and drug monitoring (13 items). Consultant gastroenterologists, colorectal surgeons, and nurses with specialist experience in IBD were defined as the corresponding professionals with at least 3 years of working experience in IBD management. We conducted this study in compliance with the principles of the Declaration of Helsinki. The study was approved by the Medical Ethics Committee of Renji Hospital, School of Medicine, Shanghai Jiao Tong University (approval No. 81670497). All participants gave informed consent when filling in the questionnaires.

RESULTS

1. Characteristics of Participants and Their Units

The questionnaires were e-mailed to 350 physicians. A total of 169 respondents from 132 medical centers in Mainland China, Hong Kong, Taiwan, Japan, South Korea, India, Malaysia, Singapore, and Thailand participated in the survey. The response rate was 48.3%. However, only 1 physician from Malaysia, Singapore, and Thailand separately responded. To make data more representative, we focused on the questionnaires mainly from Mainland China, Hong Kong, Taiwan, Japan, South Korea, and India (166 respondents from 129 centers in all). Over half of the respondents were center principals as well as senior IBD specialists (≥5 years) from academic teaching hospitals. Characteristics of the respondents and their units were depicted in Table 1. Generally, 78.3% of the respondents looked after not only adult IBD patients but also those under 18 years old. Meanwhile, 68.1% had their own electron-

Table 1. Characteristics of Respondents and Their Units

Characteristics	Mainland China	Japan	South Korea	India	Hong Kong	Taiwan
No. of respondents	104	30	17	7	4	4
No. of medical centers	74	28	15	6	3	3
No. of newly-diagnosed IBD patients in the last year per center, median	50	15	24	100	31	5
UC patients (%)	58.8	66.3	59.4	77.4	55.5	60.5
CD patients (%)	36.2	32.7	39.0	18.8	41.5	36.8
IBDU patients (%)	5.0	1.0	1.6	3.7	3.0	2.7
No. of IBD consultant gastroenterologists per center, average	4.2	4.0	3.0	3.4	3.8	4.8
No. of IBD consultant colorectal surgeons per center, average	2.1	2.3	1.7	2.1	2.5	1.5
No. of IBD nurses per center, average	2.5	1.3	1.6	0.3	1.3	1.3
Respondents who treated IBD patients under 18 years old	83 (79.8)	27 (90.0)	13 (76.5)	6 (85.7)	1 (25.0)	1 (25.0)
Respondents who had IBD electronic databases	71 (68.3)	21 (70.0)	13 (76.5)	4 (57.1)	2 (50.0)	4 (100.0)
Respondents who had MDT for IBD management	78 (75.0)	6 (20.0)	7 (41.2)	3 (42.9)	1 (25.0)	1 (25.0)

Values are presented as number (%) unless otherwise indicated.
IBD, inflammatory bowel disease; UC, ulcerative colitis; CD, Crohn's disease; IBDU, IBD unclassified; MDT, multiple disciplinary teams.

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ic databases for IBD patients and 56.0% had specific multiple disciplinary teams for IBD management in their working hospitals, which reflects the experience and maturity of IBD team development in the surveyed areas.

2. General Strategy

More than half of the respondents prescribed 5-aminosalicylic acid (5-ASA)/sulfasalazine (SASP), steroids, azathioprine (AZA), methotrexate (MTX), cyclosporin A, infliximab (IFX), and adalimumab (ADA) from their hospitals for inducing remission in IBD. 6-Mercaptopurine, cyclophosphamide, FK506, mycophenolate mofetil, thalidomide, certolizumab, vedolizumab, golimumab, and biosimilars were only available in at most 40% of the centers.

5-ASA/SASP (99.4%) and corticosteroid (83.7%) were the most preferred first-line choices for mild-moderate ulcerative colitis (UC) and severe UC, respectively (Fig. 1A and B). The first-line medication for Crohn's disease (CD) markedly varied among the respondents, as corticosteroid (68.1%) was the most preferred in Mainland China, Japan, and South Korea (Fig. 1C). Apart from primary treatment, 89.2% of the respondents applied nutritional therapy to IBD patients.

Step-up strategy for mild-moderate UC was chosen by 96.4% of the respondents, while it was only favored by 36.1% for severe UC (Fig. 2A and B). For CD, 51.8% of the respondents selected top-down treatment, while 38.6% preferred a step-up way (Fig. 2C).

3. 5-ASA/SASP

pH-depended 5-ASA was available in 92.2% of the surveyed centers, followed by time-released (84.3%), enema (80.7%), suppository (80.1%), SASP (77.7%), and MMX (38.0%) dosage forms.

5-ASA/SASP was widely used for induction and maintenance of IBD remission (Table 2). However, when inducing remission of severe UC, 88.6% of the respondents would combine 5-ASA/SASP with steroids. One-third of them used 5-ASA/SASP for 1–3 months to induce disease remission, and for 3–5 years to maintain remission. Forty percent of them regarded 5-ASA/SASP as a lifelong medication without termina-

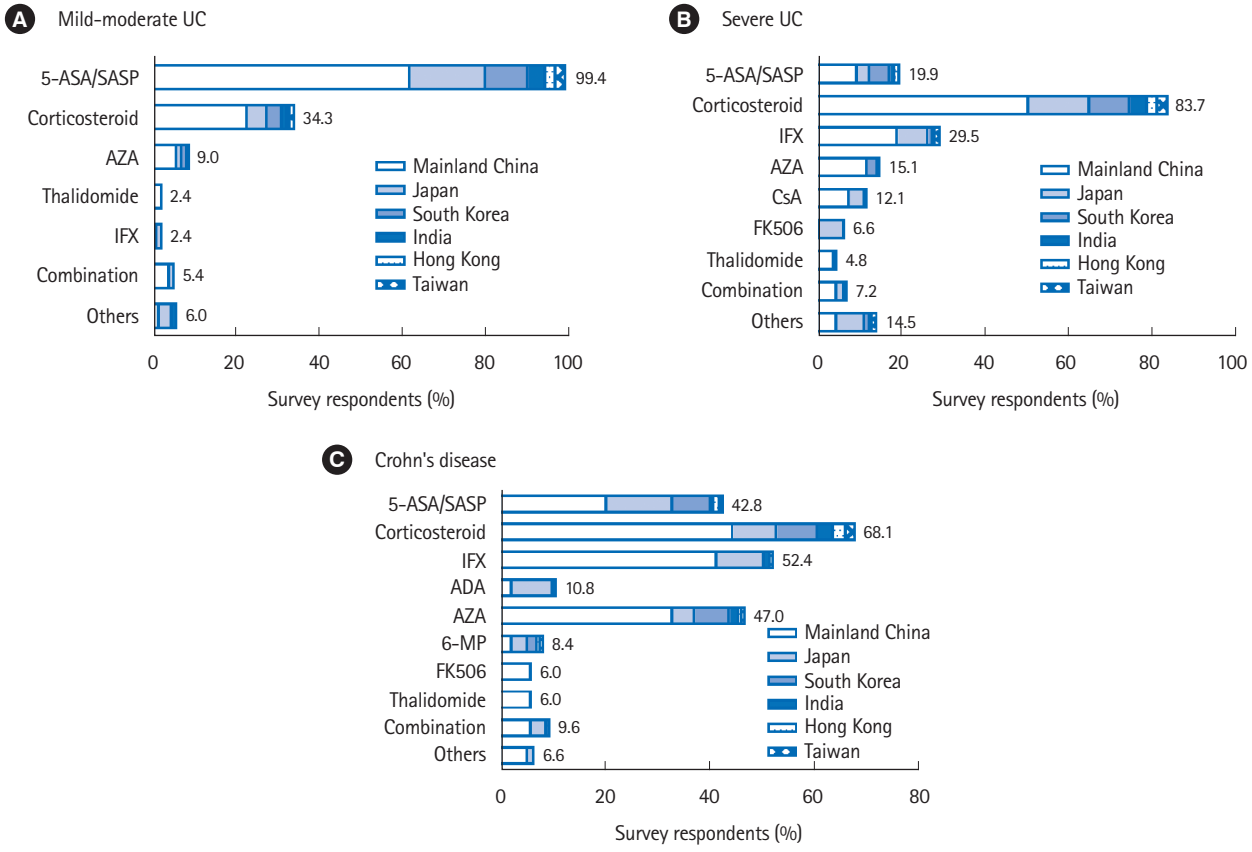

Fig. 1. First-line choice selected for mild-moderate ulcerative colitis (UC) (A), severe UC (B), and Crohn's disease (C). 5-ASA, 5-aminosalicylic acid; SASP, sulfasalazine; AZA, azathioprine; IFX, infliximab; CsA, cyclosporin A; ADA, adalimumab; 6-MP, 6-mercaptopurine.

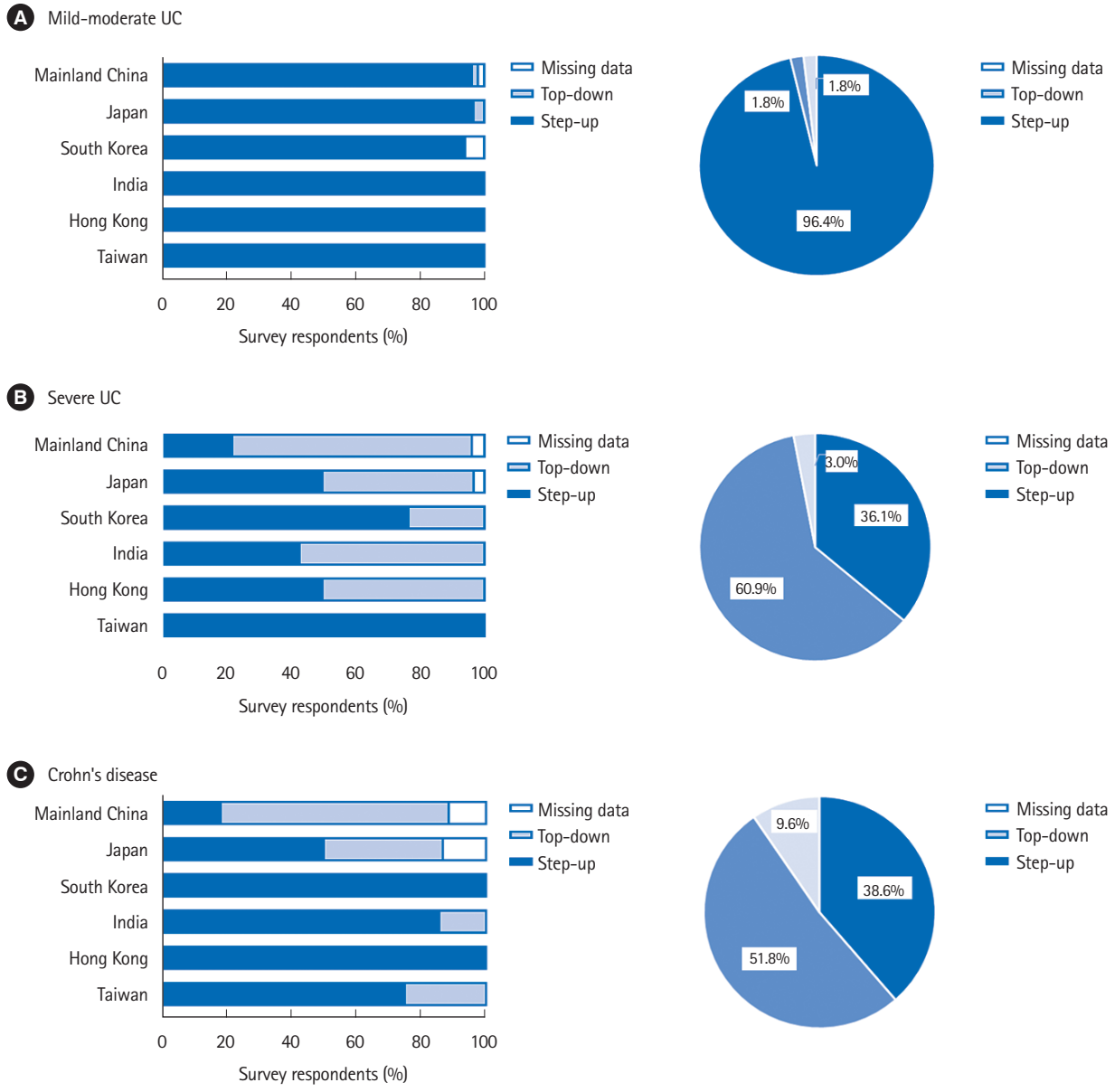

Fig. 2. Treatment strategy selected for mild-moderate ulcerative colitis (UC) (A), severe UC (B), and Crohn's disease (C). Right-side figures are the general data from all the surveyed areas.

tion unless adverse events (AEs) occurred. Moreover, 68.1% would use it as long-time chemoprevention against colorectal cancer.

Combined oral and local preparations of 5-ASA/SASP were favored by most of the respondents for left-side colitis (Table 2). Following intestinal resection, 5-ASA/SASP was used by less than one-third of the respondents in UC (17.5%), CD (25.3%), and both UC and CD patients (28.3%). The use of 5-ASA/SASP in pouchitis was 76.5%.

4. Steroids

Methylprednisolone was selected by 49.4% of the physicians for induction of remission by intravenous (IV) administration, followed by hydrocortisone (26.5%) and prednisolone (20.5%). Prednisone (48.2%) was the most favored oral corticosteroid. Thirty-seven percent of the respondents used IV corticosteroids for 5–7 days before switching to rescue therapy. Almost all of the physicians would not maintain IV steroids for more than 2 weeks. About half of them tapered oral steroids within 1–3 months while 33.7% tapered within a month, and 15.1% continued steroids for maintenance in dependent or refractory cases.

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Table 2. The Acceptance of 5-ASA/SASP in Induction and Maintenance of IBD Remission

Variable	Induction of remission	Maintenance of remission
For UC		166 (100.0)
Mild-moderate UC	165 (99.4)	
Severe UC	79 (47.6)	
For CD	80 (48.2)	101 (60.8)
Combined use of oral and local 5-ASA/SASP		
Proctitis	126 (75.9)	113 (68.1)
Left-side colitis	157 (94.6)	148 (89.2)
Pancolitis	127 (76.5)	118 (71.1)
Left-side colonic CD	70 (42.2)	68 (41.0)

Values are presented as number (%).
5-ASA/SASP, 5-aminosalicylic acid/sulfasalazine; IBD, inflammatory bowel disease; UC, ulcerative colitis; CD, Crohn's disease.

Table 3. The Selection of Biologics in Induction and Maintenance of Inflammatory Bowel Disease Remission

Drug	Induction of remission	Maintenance of remission
First-line biologics		
Infliximab	149 (89.8)	146 (88.0)
Adalimumab	38 (22.9)	32 (19.3)
Golimumab	8 (4.8)	5 (3.0)
Vedolizumab	2 (1.2)	2 (1.2)
Certolizumab	0	0
Ustekinumab	0	0
Biosimilar	0	3 (1.8)
None	7 (4.2)	9 (5.4)
Second-line biologics		
Infliximab	16 (9.6)	17 (10.2)
Adalimumab	65 (39.2)	59 (35.5)
Golimumab	6 (3.6)	8 (4.8)
Vedolizumab	17 (10.2)	17 (10.2)
Certolizumab	1 (0.6)	0
Ustekinumab	7 (4.2)	4 (2.4)
Biosimilar	0	0
None	69 (41.6)	76 (45.8)

Values are presented as number (%).

5. Immunomodulators

Most respondents (65.7%) selected AZA as the first-line immunomodulator for induction of remission, followed by cyclosporine (18.1%) and tacrolimus (6.6%). Thalidomide (3.0%) and MTX (5.4%) were preferred only by physicians from Mainland China, while tacrolimus (6.6%) was preferred only by Japanese physicians. For maintenance of remission, AZA (96.4%) was also the first immunomodulator selected by almost all the respondents. As for the second-line immunomodulator, 35.5% and 41.6% selected MTX for inducing remission and maintaining remission, respectively. Over one-fifth of the respondents did not have a second-line immunomodulator in their units. Thalidomide was demonstrated to be preferred only by physicians from Mainland China. There were various answers to the average duration of estimating the immunomodulator last for maintenance of remission, as 25.9% of the respondents thought it should last for 3–5 years, while 16.3%, 13.9%, and 10.8% considered it for 2–3 years, 1–2 years and less than 3 months, respectively.

6. Biologics

IFX (89.8%) and ADA (39.2%) were the most favored drugs as the first-line and second-line biologics in IBD induction of remission, respectively. They were also widely used for maintaining remission (Table 3). However, over 40% of the respondents had no second-line choice of biotherapy. The variety of biologics was larger in Japan and South Korea than it in Mainland China by the time of the investigation, as IFX (Remicade) was the only approved biological agent for IBD treatment in China before 2020. In terms of funding, about half of the physicians identified the existence of reimbursement program (44.0%) and charity (56.6%) for biologics in their sites, but with various local regulations instead of national uniform regulations.

7. Drug Monitoring

The most frequent AE of 5-ASA/SASP observed in respondents' clinical experiences was related to digestive system (54.2%; gastrointestinal symptoms, liver dysfunction and pancreatitis), followed by allergy (30.1%) and myelosuppression (13.9%). During corticosteroid treatment, metabolic disorder was listed as an AE by 60.8% of the respondents, followed by infection (19.9%), gastrointestinal symptoms (14.5%), osteoporosis (13.9%), and neurological symptoms (7.2%) (headache and insomnia). Based on the survey, myelosuppression (66.3%), especially leukopenia, and gastrointestinal symptoms (31.9%) were comparatively common AEs when immunomodulator was used, while anaphylaxis and infusion reaction (54.2%) were the most frequent AEs for biological agents. Biologics also caused some rare AEs, such as lethargy, arthralgia and palpitation. There was some discrepancy among the re-

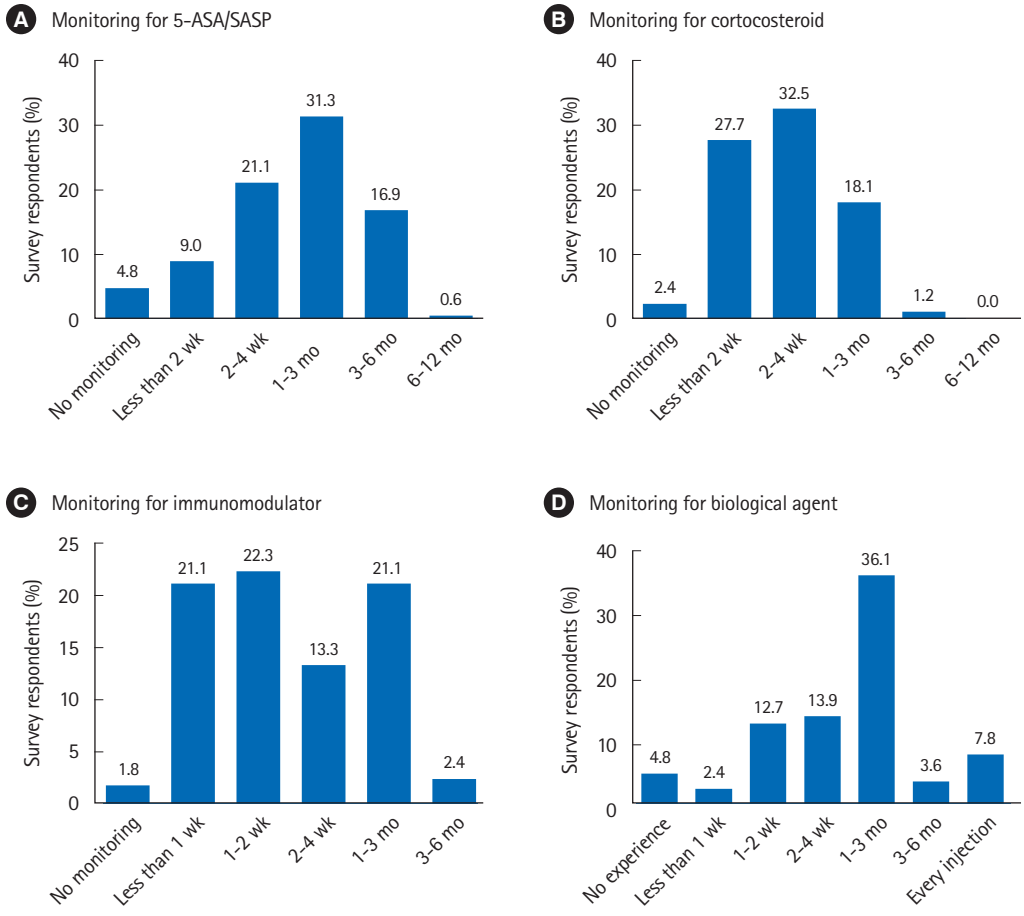

Fig. 3. Frequency for monitoring adverse events of 5-aminosalicylic acid (5-ASA)/sulfasalazine (SASP) (A), corticosteroid (B), immunomodulator (C), and biological agent (D).

spondents regarding the frequency for monitoring drug AEs (Fig. 3).

In terms of biomarkers, more than half of the respondents had access to calprotectin, while less than one-third could test blood concentration of IFX, antibody to IFX, and tumor necrosis factor α (TNF-α) (Fig. 4A). The concomitant infection rate in IBD patients with immunomodulators or/and biologics treatment was less than 5% according to 68.6% of the respondents (Fig. 4B). Lymphoma was also monitored after IBD treatment (Fig. 4C).

Clinical evaluation (94.6%) was the most primarily used assessment for IBD severity or therapeutic response, followed by blood test (92.8%) and endoscopic examination (91.0%). Nevertheless, radiological imaging was only carried out by 72.3% of the physicians. Comprehensive evaluation (endoscopic, biochemical, and radiological) was carried out by one-third in 1–2 years, 22.3% in 6–12 months, and 18.1% in 3–6 months.

DISCUSSION

This questionnaire-based survey was performed to obtain a comprehensive acquaintance of the current status on drug therapy and monitoring for IBD in Asia. According to the results, the quantity and type of IBD patients were quite diverse among the surveyed nations based on the different hospital scales and disease epidemiology. We found that UC patients were somewhat more than CD patients, which is consistent with previous studies.[7,8] An uneven distribution of IBD-related medical resources exist among Asian countries, such as consultant gastroenterologists, colorectal surgeons, and nurses with specialized knowledge and skills. The delivery of health care for IBD is complex and requires multiple disciplinary teams with specialist training,[9] which is quite insufficient in current status according to the investigation.

As therapeutic armamentarium for IBD is rapidly expanding in recent years, therapeutic principles and goals have

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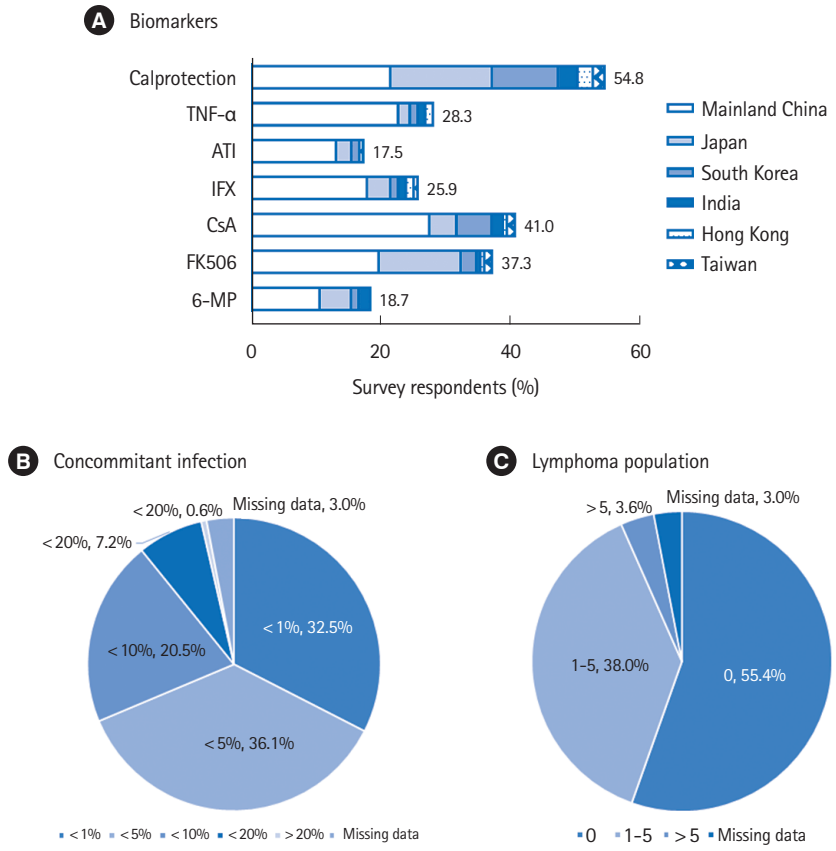

Fig. 4. Available biomarkers tested in the respondents' working hospitals (A), concomitant infection rate in patients with immunomodulatory or/and biologics (B), and lymphoma population after inflammatory bowel disease (C). TNF-α, tumor necrosis factor α; ATI, antibody to infliximab; IFX, infliximab; CsA, cyclosporin A; 6-MP, 6-mercaptopurine.

gradually shifted from symptom control towards a treat-to-target paradigm such as mucosal healing and prevention of bowel damage.[10,11] Various differences were observed in the present survey regarding the drug therapy for IBD in Asia. The diversity may be attributed to the differences in local approved drugs, treatment concepts, and economic factors.[8]

The "step-up" strategy refers to apply corticosteroids and/or immunomodulators before initiating biologics. However, as the "top-down" concept was proposed by treating patients more aggressively with initial therapy of biological agents, mounting evidences have confirmed its efficacy.[12,13] In our survey, more than half of the respondents chose top-down strategy for severe UC and CD. This option was mainly selected by physicians from Mainland China and Japan. IV steroids followed by IFX/cyclosporin or surgery is particularly a salvage treatment instead of a step-up treatment for severe UC, which might be the conceptual confusion for the respondents (36.1%) who chose step-up strategy for severe UC. Top-down strategy is more acceptable when biological agents are affordable, easy to obtain and with cost-effective ways to monitor. However, many respondents remarked in the questionnaire that the therapeutic decision should depend on individual conditions.

Our survey demonstrated that 5-ASA/SASP was preferred by almost all the physicians as the first-line therapy for induction and maintenance in mild-moderate UC patients, which accords with the solid evidences reported before.[14-16] In this group of patients, 5-ASA/SASP will remain the mainstay of therapy due to its efficacy and tolerance.[11] Combination of oral and topical 5-ASA, which is confirmed more effective than oral use alone in UC treatment, has been used by a majority of physicians.[17] Although a Cochrane review in 2005 has already revealed that 5-ASA is not superior to placebo for maintaining remission in CD patients,[18] 61.4% of the respondents in the investigation still prescribed it in clinical due to its low cost, easy access and efficacy to inhibit nonspecific intestinal inflammation, which highlights the disconnection between evidence-based medicine and real-world medical prac-

tice. However, 5-ASA has been proven to effectively decrease the risk of colorectal cancer in IBD, which facilitates it as a chemoprevention against colorectal cancer.[19,20]

Corticosteroids come into effect faster than other conventional drugs in active IBD and are extensively used for symptom control in a short time. Based on our findings, methylprednisolone and prednisone were the most favored steroids for IV and oral administration, respectively, which is in keeping with the guidelines in terms of minimizing the mineralocorticoid effects.[21] Although Budesonide, a new type of corticosteroid applied in IBD recently, can effectively induce remission in mild-moderate disease with less unwanted side effects,[11,21-23] only 1.2% of the respondents mentioned it in the questionnaires as it was not widely available in Asia by the time of the survey.

AZA and MTX were widely used as immunomodulators for IBD in Asia according to our investigation. Both of them can work as steroid-sparing agents.[24] In current SONIC and SUCCESS trials, it is strongly indicated that the combination therapy of AZA plus anti-TNFs leads to a better remission over monotherapy in both CD and UC.[25,26] However, there lacks sufficient evidence proving the role of MTX in UC patients, except its potential effect to reduce immunogenicity in combined treatment with biologics.[21] Interestingly, we found that more than one-tenth of the respondents (all from Mainland China) chose thalidomide as a second-line immunomodulator. As IFX was the only approved biologics for IBD treatment in Mainland China before 2020, with a higher cost than conventional drugs, a certain proportion of Chinese physicians tend to choose thalidomide due to its similar mechanism of inhibiting TNF-α.[27,28] In addition, thalidomide can also suppress interleukin 12 and interfere with the expression of integrin, with a much cheaper cost.[29,30] Retrospective study has confirmed its effect in adults with refractory CD.[31] However, only 1 randomized controlled trial has proved thalidomide's efficacy in pediatric CD, and present potent evidence is insufficient to support its use for induction of remission in adult CD or UC, or for maintenance of remission in IBD.[30,32]

Drug therapy for IBD has been gradually coming into a "biologics" era as multiple novel biological agents have been and will be put into use in clinical practice. Anti-TNFs, including IFX, ADA, golimumab, and certolizumab at present, are the most widely applied types, among which IFX owns the longest history of over 20 years since its approval for CD treatment.[33] According to the survey, IFX (first-line) and ADA (second-line) were the 2 main biological forces in Asia, while other biologics were only selected by a small fraction of the physicians, usually when patients lost response to IFX or ADA. This might be due to the late launch of the new biologics in markets. Golimumab was first introduced in Asia (South Korea and Hong Kong) for UC treatment in 2014, and vedolizumab was approved for both CD and UC in South Korea, Japan, and Mainland China between 2017 and 2020. Meanwhile, ustekinumab was just approved for CD in the United States in 2016 and it takes time for it to be widely available in Asia. As far as we know, some biologics had already been used by the respondents as off-label medicines before they were approved for IBD indications. However, over 40% of the physicians had no second-line choices of biologics in their hospitals, which indicates the inadequate alternatives if first-line biotreatment fails. Furthermore, the high cost of biologics with insufficient reimbursement program or charity may probably limit their use in Asia and widen the gap of biotherapy experiences from Western countries.

Conventional medications and novel biological agents all may cause AEs or lose efficacy in certain IBD patients. Therefore, monitoring for drug side effects and blood concentrations are essential for IBD health care. In thiopurines treatment, thiopurine S-methyltransferase (TPMT) genotype has been proven as the primary determinant of TPMT activity and recommended to detect before drug initiation.[34] In addition, NUDT15 polymorphism was found better than TPMT as predictor of leukopenia in Chinese CD patients.[35] Monitoring serum level of 6-thioguanine, the active metabolite of 6-mercaptopurine, has turned out to be useful for thiopurine optimization.[36] But unfortunately, we did not contain the questions about genetic detection and 6-thioguanine assessment in the questionnaire.

Therapeutic drug monitoring (TDM) was originally used in thiopurines treatment and has been gradually used in IBD patients treated with biologics to achieve desired drug concentration and avoid anti-drug antibody formation.[37] Quite a number of studies have confirmed the merits of TDM, especially proactive TDM, in optimizing treatment, reducing medication costs and improving outcomes for IBD patients.[38-46] However, appropriate interpretation of TDM should be considered given the variabilities in types of assays, timing of blood sampling, dosing history, immunogenicity and patients' clinical status.[37,47] Less than 30% of the physicians could measure serum levels of IFX and antibody to IFX in their hospitals according to our survey, which greatly restricts the development of TDM. In the United States, out-of-pocket cost is re-

ported as a barrier toward TDM of anti-TNF therapy,[48,49] which is also the same throughout Asia. Further efforts are required to increase low-cost assays or to make the costs covered by national insurance.

There are several limitations in this study. First, although 169 physicians participated in the investigation, the overall response rate was low, which limits the representativeness. Second, the respondents were mainly from Mainland China, Japan, and South Korea, which may have caused selection bias. Moreover, several questions in the questionnaire were ambiguous and no clear options were given, which may bring difficulties for interpretation of the answers.

The management of IBD has evolved from empirical treatment to treat-to-target therapy, then now to a personalized, proactive and patient-centered care.[50] The present survey reflects the current status of drug therapy and monitoring for IBD in Asia, with commonalities as well as differences. Asian version of recommended indicators for drug therapy and monitoring is encouraged to be established for further improvement. More importantly, IBD specialist teams, novel biological agents and practice of TDM are much required to ameliorate IBD health care, which is quite challenging and with efforts to take.

ADDITIONAL INFORMATION

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Conflict of Interest

Wu K, Qian J, and Ran Z are editorial board members of the journal but were not involved in the peer reviewer selection, evaluation, or decision process of this article. No other potential conflicts of interest relevant to this article were reported.

Author Contribution

Conceptualization: Shen J, Tong J, Zheng Q, Wu K, Qian J, Ran Z. Data curation: Cai C, Lu J, Lai L, Song D. Formal analysis: Cai C, Lu J, Song D. Funding acquisition: Ran Z. Investigation: Cai C, Lu J. Methodology: Ran Z. Project administration: Ran Z. Supervision: Shen J, Wu K, Qian J, Ran Z. Writing - original draft: Cai C, Lai L. Writing - review & editing: Qian J, Ran Z. Approval of final manuscript: all authors.

Others

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Supplementary Material

Supplementary materials are available at the Intestinal Research website (https://www.irjournal.org).

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See "Drug therapy and monitoring for inflammatory bowel disease: a multinational questionnaire investigation in Asia" on pages 213-223.

Supplementary Material. AOCC 2018 Physician Questionnaire

Drug Therapy and Monitoring for IBD in Asia: Current Status

To be sent to one participant at each hospital on behalf of the IBD specialists. The survey is multiple choices except where numbers are asked for so hopefully minimizes translation requirements.

Benefit for AOCC 2018:
This multiple choice questionnaire will in effect be a mini-audit of the institutions providing IBD Drug Therapy and, will provide prima facie evidence to justify support for ongoing work on therapeutic quality improvement for IBD patients. Some immediate benchmarking would be possible between institutions and a comparison with the topline IBD Audit results in the Asian countries.

How this helps me/us prepare for the AOCC 2018 annual meeting:
This will give me a better understanding of the extent to which the people attending are from similar or dissimilar institutions and what stage of development they are at in terms of an IBD drug therapy and monitoring.

Please fill out the questionnaire after each question and return to our office or at secretariat@aocc2018.org by April 20, 2018.

Name of hospital:
City: **Country:**

Survey completed by:
Your name (Given name/Surname)

_____

Your unit and patients

1. How many IBD patients do you have?
2. What % has UC, CD and IBDU?
3. How many new IBD patients have been diagnosed in the last 12 months?
4. Do you look after patients who are under 18 years old?
5. Do you have an electronic database for IBD patients?
6. How many consultant gastroenterologists with specialist experience in IBD?
7. How many consultant colorectal surgeons with specialist experience in IBD?
8. How many nurses with specialist experience in IBD?
9. Does your hospital have specific MDT team for IBD?

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Induction of remission/Strategy

10. Which of the following drugs you can prescribe from your hospital for inducing remission in IBD?
    ☐ 5-ASA/SASP ☐ steroids ☐ AZA ☐ 6-MP ☐ MTX ☐ CTX ☐ CSA ☐ FK506 ☐ mycophenolate mofetil
    ☐ Thalidomide ☐ IFX ☐ ADA ☐ Certolizumab ☐ Vedolizumab ☐ Golimumab ☐ Biosimilar

11. Which is the first line choice you selected for mild to moderate UC?
    ☐ 5-ASA/SASP ☐ steroids ☐ AZA ☐ 6-MP ☐ MTX ☐ CTX ☐ CSA ☐ FK506 ☐ mycophenolate mofetil
    ☐ Thalidomide ☐ IFX ☐ ADA ☐ Certolizumab ☐ Vedolizumab ☐ Golimumab ☐ Biosimilar ☐ Combination
    (Please specify_____)

12. Which is the first line choice you selected for severe UC?
    ☐ 5-ASA/SASP ☐ steroids ☐ AZA ☐ 6-MP ☐ MTX ☐ CTX ☐ CSA ☐ FK506 ☐ mycophenolate mofetil
    ☐ Thalidomide ☐ IFX ☐ ADA ☐ Certolizumab ☐ Vedolizumab ☐ Golimumab ☐ Biosimilar ☐ Combination
    (Please specify_____)

13. Which is the first line choice you selected for CD?
    ☐ 5-ASA/SASP ☐ steroids ☐ AZA ☐ 6-MP ☐ MTX ☐ CTX ☐ CSA ☐ FK506 ☐ mycophenolate mofetil
    ☐ Thalidomide ☐ IFX ☐ ADA ☐ Certolizumab ☐ Vedolizumab ☐ Golimumab ☐ Biosimilar ☐ Combination
    (Please specify_____)

14. Which are the supplementary drugs in your unit?
    ☐ probiotics ☐ nutrition ☐ traditional medicine ☐ material supplements

15. Which strategy will be chosen for mild to moderate UC?
    ☐ step-up ☐ top-down

16. Which strategy will be chosen for severe UC?
    ☐ step-up ☐ top-down

17. Which strategy will be chosen for Crohn's disease?
    ☐ step-up ☐ top-down

Induction of remission/5-ASA/SASP

18. Do you have the following formulations of 5-ASA in your site?
    ☐ PH-depended ☐ time-released ☐ MMX ☐ SASP ☐ enema ☐ suppository

19. Will you use 5-ASA/SASP for mild to moderate UC when induction o remission?
20. Will you use 5-ASA/SASP for severe UC when induction of remission?
21. Will you use 5-ASA/SASP for Crohn's disease when induction of remission?
22. How long will you use 5-ASA/SASP when induction of remission?
23. Will you combine oral and local preparations for proctitis?
24. Will you combine oral and local preparations for left-side colitis?
25. Will you combine oral and local preparations for pancolitis?
26. Will you combine oral and local preparations for colonic Crohn's disease with left-side colon involved?
27. Which formulation is your first line choice if you have to use 5-ASA/SASP?

Induction of remission/Steroids

28. Which corticosteroid will be selected for induction of remission by IV?
29. Which oral formulation of corticosteroid will be selected for induction of remission?
30. How long is the intravenous use of corticosteroids before switching to rescue therapy?
31. How long will oral corticosteroids taper down?

Induction of remission/Immunomodulators

32. Which is the first line immunomodulator selected for induction of remission in your hospital and how you use it?
33. Which is the second line immunomodulator selected for induction of remission in your hospital and how you use it?
34. How long will intravenous immunomodulator last before switching to oral formulations?

Induction of remission/Biologics

35. Which is the first line biologic selected for induction of remission in your hospital and how you use it?
36. Which is the second line biologic selected for induction of remission in your hospital and how you use it?
37. Does your site have the policy of reimbursement for biologics?
38. Does your site have the charity for biologics?

Maintenance of remission/5-ASA/SASP

39. Will you use 5-ASA/SASP for UC when maintenance of remission?
40. Will you use 5-ASA/SASP for CD when maintenance of remission?
41. Will you use 5-ASA/SASP for pouchitis?
42. Will you use 5-ASA/SASP after intestinal resection?
    □ UC □ CD □ No

43. How long will you use 5-ASA/SASP when maintenance of remission?
44. Will you combine oral and local preparations for proctitis?
45. Will you combine oral and local preparations for left-side colitis?
46. Will you combine oral and local preparations for pancolitis?
47. Will you combine oral and local preparations for colonic Crohn's disease with left-side colon involved?
48. Which formulation is your first line choice if you have to use 5-ASA/SASP for maintenance of remission?
49. Will you use 5-ASA/SASP as a long-time chemoprevention against colorectal cancer?

Maintenance of remission/Steroids

50. Is any patient in your hospital use corticosteroid as a choice for maintenance? How many?

Maintenance of remission/Immunomodulators

51. Which is the first line immunomodulator selected for maintenance of remission in your hospital and how you use it?
52. Which is the second line immunomodulator selected for induction of remission in your hospital and how you use it?
53. What is the average duration do you estimate the immunomodulator last for maintenance of remission?

Maintenance of remission/Biologics

54. Which is the first line biologic selected for maintenance of remission in your hospital and how you use it?
55. Which is the second line biologic selected for maintenance of remission in your hospital and how you use it?
56. What is the average duration do you estimate the biologics last for maintenance of remission?

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Drug monitoring

57. Please specify the most frequent adverse event and its percentage for 5-ASA/SASP in your clinical experience.
58. Please specify the most frequent adverse event and its percentage for corticosteroid in your clinical experience.
59. Please specify the most frequent adverse event and its percentage for immunomodulator in your clinical experience.
60. Please specify the most frequent adverse event and its percentage for biologic agent in your clinical experience.
61. What is the frequency for monitoring 5-ASA/SASP adverse events?
62. What is the frequency for monitoring corticosteroid adverse events?
63. What is the frequency for monitoring immunomodulator adverse events?
64. What is the frequency for monitoring biological agent adverse events?
65. Can your hospital test the following biomarkers?
    ☐ 6-MP ☐ FK506 ☐ CSA ☐ IFX ☐ ATI ☐ TNF-α ☐ calprotectin

66. The concomitant infection rate in your patients with immunomodulatory or/and biologics is around?
    ☐ < 1% ☐ < 5% ☐ < 10% ☐ < 20% ☐ > 20%

67. The population in your hospital for lymphoma after IBD is around?
    ☐ 0 ☐ 1-5 ☐ > 5

68. The frequent evaluation for IBD or therapeutic response in your hospital includes?
    ☐ clinical evaluation (as CDAI, etc) ☐ endoscopic ☐ blood test ☐ radiological

69. What is the frequency for one patient underwent comprehensive evaluations which may contain endoscopic, biomarker and radiological evaluation?